MACINTOSH CLASSIC • MACINTOSH LC • MACINTOSH IISI

# MACWORLD

The Macintosh® Magazine

December 1990 $3.95 Canada $4.95

*New*

## LOW-COST COLOR MACINTOSH

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THE MAC FAMILY EVOLVES
*Page 168*

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*Page 188*

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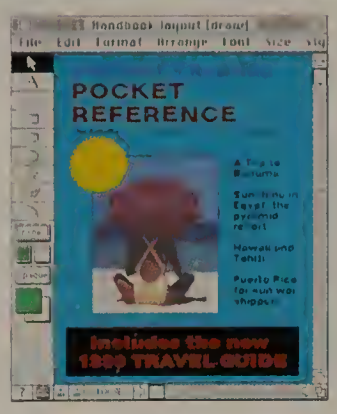


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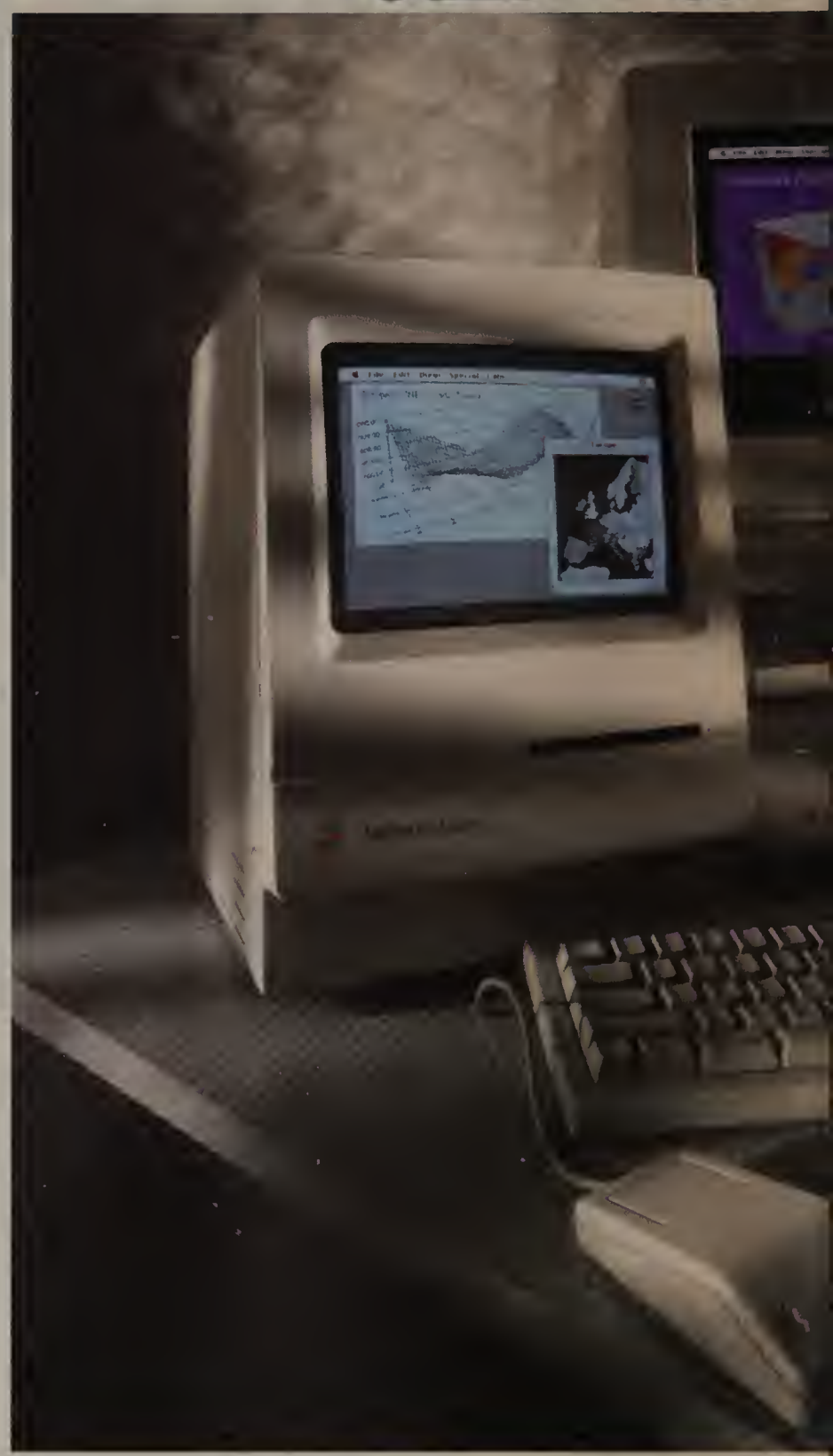

*The new Macintosh Classic, Macintosh IIsi, a*

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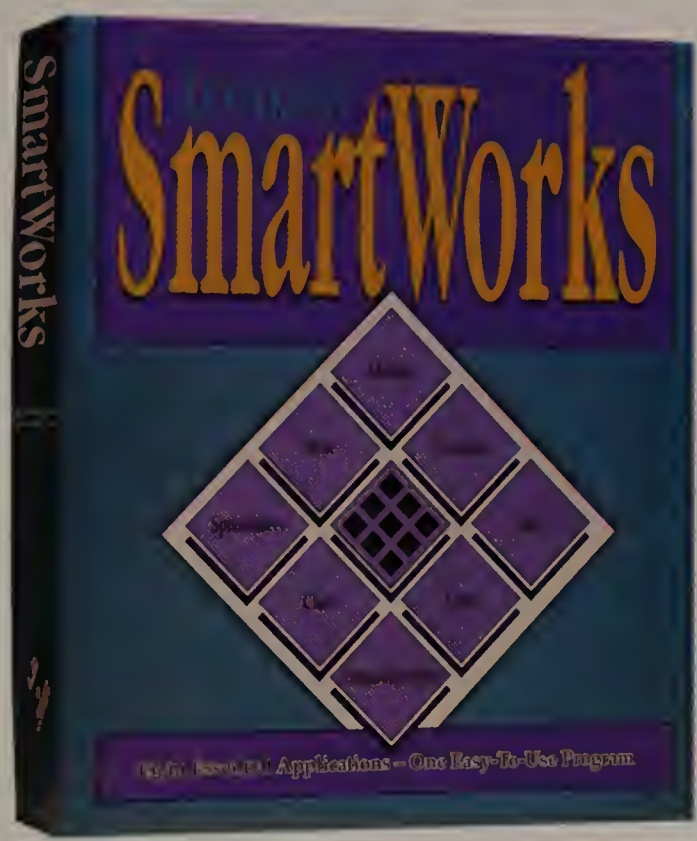


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Steve Rennie, President of REN Management Corporation

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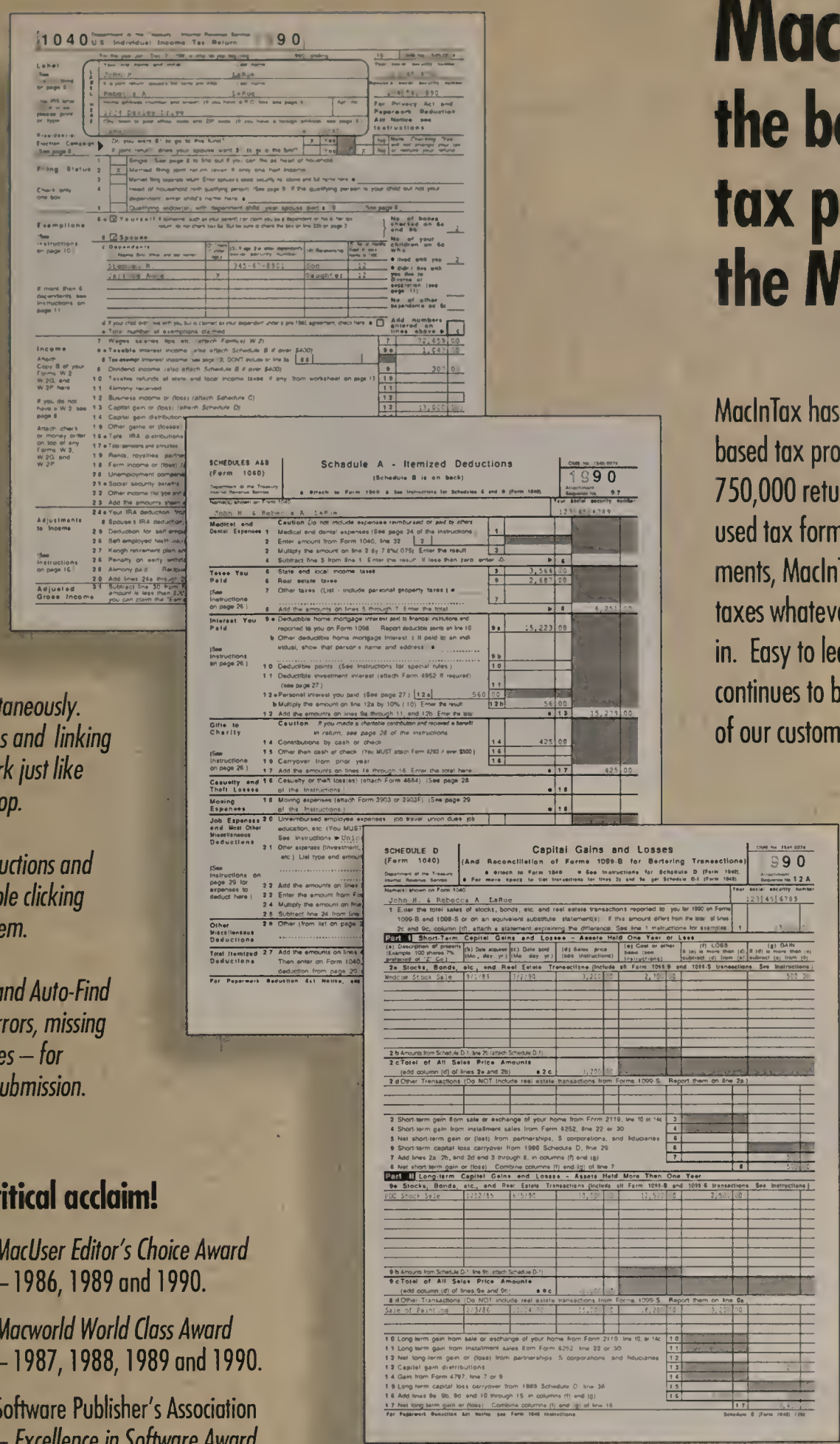


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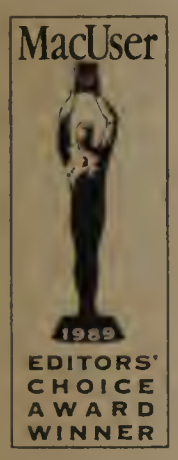


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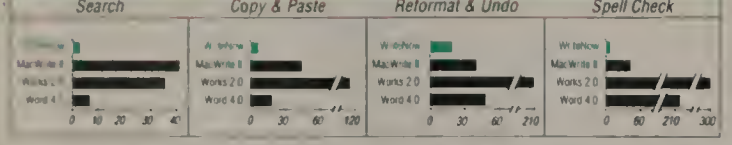


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# MACWORLD

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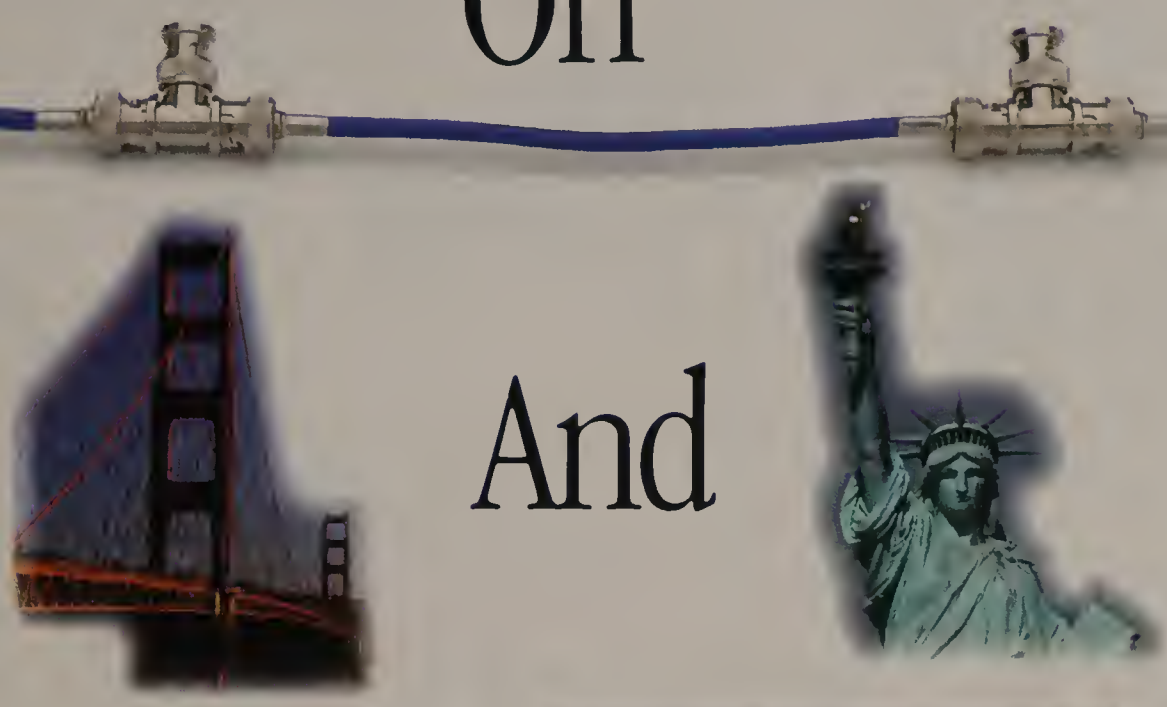

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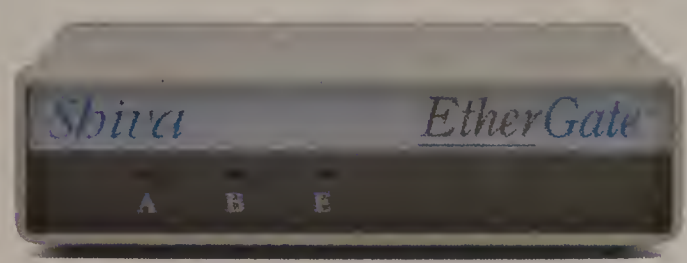


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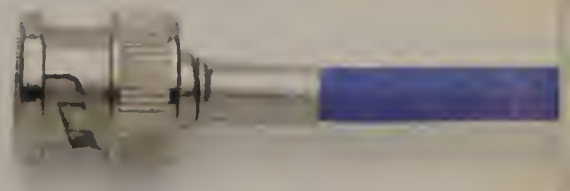

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# MacBulletin

### Boeing Admits Electromagnetic Fields Harmed Worker

In the first admission by a company that electromagnetic fields harmed an employee, Boeing has settled a lawsuit with Robert Strom, who developed leukemia after working in a Boeing electromagnetic pulse laboratory. Strom and his family will receive more than $500,000 in cash and an additional annuity. The suit alleged in part that Boeing, while knowing that the very high levels of electromagnetic fields might be harming lab workers, arranged for repeated physical examinations without revealing that the purpose of the exams was to study possible health damage. Electromagnetic fields that emanate from computer CRTs at a much lower intensity have recently come under scrutiny as potential health hazards.

### Apple Pulls System 6.0.6

After finding last-second bugs in System 6.0.6, Apple was forced to replace the system disks packed with early models of the Macintosh Classic, IIsi, and LC. The operating system sometimes could not recognize AppleTalk and sometimes caused the keyboard to freeze. Apple is replacing 6.0.6 with System 6.0.7, which the company hopes to add to all U.S. models by the time they leave dealers. In some overseas areas Apple is issuing a temporary bug fix because of localization problems. If your new Mac has System 6.0.6, contact your dealer. System 6.0.7 will also be posted on AppleLink and other electronic bulletin boards, or you can call Apple at 800/366-9622.

### Some Macintosh LCs May Ship Early to Dealers

The low-cost Macintosh LCs will probably not be on the dealer price list before mid-November, but Apple is trying to get units to its dealers early, possibly by the end of December, so that customers can inspect the new computer. Volume shipments are still expected to begin by late January, an Apple spokesperson said.

### Production Problems Delay the 68040 Processor

Motorola's 68040 processor, much heralded successor to the 68030 that is the heart of current high-end Macs, has been delayed due to manufacturing problems. The delay will move volume shipments back to the fourth quarter. The problem casts doubt on the ability of Next and other workstation vendors to ship large numbers of machines based on the 040. However, the delay has not affected any Apple systems currently under development, according to Motorola.

### Apple Slashes Cost of IIci

Apple has cut the suggested list price of the Macintosh IIci by $1500 to help position the system as the replacement for the IIcx, which the company is phasing out. A IIci with 4MB of RAM and a SuperDrive floppy disk drive now lists for $5969, down from $7469.

### Speech Recognition Advances

Emerson & Stern has developed Soliloquy, speech-recognition technology that increases the vocabulary of listening machines at least tenfold over current products. Most speech-recognition systems use spectral pattern matching, which compares each digitized word to a database of words represented as graphs of frequency versus time. Soliloquy instead represents words by how the mouth moves to pronounce them, a technique that is speaker independent. Soliloquy can also interpret broken sentences and nonstandard word order. Potential licensees can contact Emerson & Stern at 619/457-2526.

### Storm Technology Shows 60-MIPS Compression Board . . .

Storm Technology has designed a 60-MIPS digital signal processor (DSP) board that runs the company's PicturePress compression software. The $999 PicturePress Accelerator board makes the compression of 24-bit color images almost instantaneous. The board is compatible with the latest version of the JPEG image-compression standard. The PicturePress Accelerator is available now. For more information, call Storm Technology at 415/322-0506.

### . . . And Radius Demonstrates Compression Software

Radius has unveiled software, also compatible with JPEG, that it says can compress and decompress images about ten times faster than Kodak's Color Squeeze or Storm Technology's PicturePress software (not the board mentioned above). In demonstrations, the unfinished software (code-named Piculator) compresses images to as little as 1/50 their original size. Radius hopes to ship a final version by year's end at a price expected to be below $300. For more information, contact Radius at 408/434-1010.

### Ariel Unveils Early DSP56001 Board for the Mac

Ariel Corporation is shipping the first digital signal processing (DSP) board that's based on Motorola's powerful DSP56001 chip and intended for the Macintosh II series. Called the Mac-56, the board is designed

*(continues)*

to speed up applications such as digitized audio, video, and graphics. At first it will ship only to developers, along with a DSP development toolkit. The Mac-56 sells for $2995 and is available from both Ariel and Momentum Data Systems, which wrote some of the software for developers. For more information, contact Ariel at 201/249-2900, or Momentum at 714/557-6884.

### Utility Synchronizes Mac II Displays to TV Cameras

As one more step in Mac-video integration, Apple has introduced VideoSync, an extension to system software that helps synchronize Mac II screens when they are being taped by consumer-grade video cameras. Having installed VideoSync in the System Folder, the user adjusts the timing of the display board until the Mac's screen appears stable on NTSC video-recording equipment. However, the utility requires a Mac II–series CPU, System 6.0.4 or later, an AppleColor High-Resolution RGB Monitor, and an Apple display board. It also works with some third-party displays that support Apple display adapters, according to Apple. The utility costs $35 and is available through APDA. For more information, call APDA at 800/282-2732.

### PSI Ships Bus-Extender Board for Mac IIsi

Pinnacle Sales International is offering a bus-extender board that fits into the SE/30 slot on Apple's new Mac IIsi and lets users add cache RAM or a floating-point unit (FPU) math coprocessor and still be able to add on a network or accelerator board. Called the SE/30 Bus Adaptor Card with Cache/FPU Option, the $99 device is similar to the bus extender offered by Apple but does not require the buyer to pay for an FPU if it's not needed. PSI also says it has begun shipping its Complete Fax/Modem, an internal board for the Apple Portable. The $599 board sends faxes at 9600 bits per second and its modem transmits at 2400 bps. If the Portable is in sleep mode when a transmission comes in, the Complete can wake the system up. For more information, contact PSI at 408/559-8544 or 800/622-1722.

### ArchiCAD is Abuilding

Version 4.0 of Graphisoft's ArchiCAD will add many new features. New rendering capabilities include antialiasing, material properties, 24-bit color, and RenderMan compatibility. The new version also supports direct import of Swivel 3D objects; unlimited layering; entering and editing multiline text directly on the image; and batch rendering of animation sequences. Pricing for version 4.0 was not set at press time. For more information, contact Graphisoft at 415/266-8720.

### Automatic Publishing

A new version of Timeworks' low-end page-layout package Publish It Easy incorporates tools not yet available in the full-featured version, Publish It. The program can automatically choose font and style settings for imported text and headlines; in thumbnail view, you can change page order and move objects from page to page; and a slide-show feature displays sequences of pages with dissolves, wipes, and other transition effects. Version 2.0 generates a checklist for service bureau–bound files, creates spot-color separations, and can import PICT2, TIFF, Apple II word processor, and Apple II graphics formats. It will list for $249.95. Timeworks is at 708/948-9200.

### Eastgate Drives on Deeper into Hypertext

Eastgate Systems, publisher of the hypertext authoring system Hypergate Writer and Hypergate-based works like the political simulation The Election of 1912, is preparing new hypertext works and will publish a new authoring system called Storyspace. Storyspace has both outliner-like hierarchical features and hypertext linking; provides intelligence to use in guiding a reader's path through a document; and can export documents to HyperCard 2.0 with all links intact. Afternoon, Eastgate's first Storyspace-based novel, concerns a man reluctant to confirm that a car accident he just witnessed may have killed his estranged wife and son. Storyspace will list for $160, and Afternoon for $19.95. Eastgate Systems is at 617/924-9044.

### FontMonger to Support TrueType

Ares Software is entering the market with FontMonger, a utility that converts fonts in any direction among Type 1, Type 3, and TrueType. FontMonger maintains hinting information, has support for inferior and superior characters, and can access glyphs (special characters not ordinarily available from the keyboard, such as ligatures). FontMonger will list for $99.95. For more information, call 415/578-9090.

### Competition for MacInTax

ChipSoft is developing a Mac version of TurboTax that, like MacInTax, produces IRS-ready income tax forms, but also has features SoftView's product lacks. TurboTax's help system walks users through complex problems such as setting up a depreciation schedule, and its Data Examiner checks for conflicting or incomplete information. TurboTax imports files directly from Quicken, Managing Your Money, Excel, and MacInTax. It lists for $89, and schedules for 11 large states will be available for 1990. For more information, contact ChipSoft at 619/453-8722.

### The Evolution of Answers

Evolver, an add-on to Wingz, is bringing genetic algorithms to the Mac. Evolver is a nonlinear optimizer that monitors its own output and modifies its search for the best solution to numerical models constructed in Wingz. Unlike Heizer's Best Answer, Evolver can optimize for nonlinear, random, and stochastic situations such as fluctuating interest rates. Axcélis is also developing an Excel-compatible version of Evolver; both versions will list for $145. For more information, contact Axcélis at 206/624-2446. ◻

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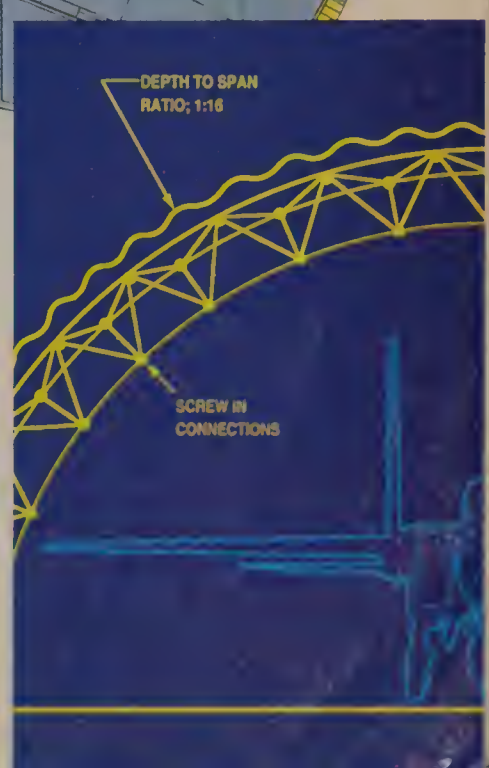


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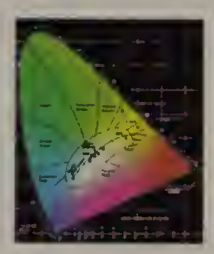

*SuperMatch is based on the CIE color model, which mathematically defines all colors the human eye can perceive.*

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## An Open System Keeps Your Options Open.

SuperMatch is unique in that it's an open color matching system, supported by all the leading color scanner and printer vendors.

# SuperMatch™

*With SuperMatch the color you display is the color you print.*

Which means it works with virtually any Macintosh II color peripheral you might use. And because it's completely transparent to your software, SuperMatch works with any application.

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The SuperSource for Color

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# *Technology and Science Policy in the Late Twentieth Century: ELF Emissions*

BY JERRY BORRELL

When in the course of human events society becomes sophisticated enough to develop technology that exceeds its ability to understand or assess, government has the responsibility to provide guidance and, if needed, regulation regarding the use of that technology.

These high-sounding words reflect upon the issue of extremely-low-frequency (ELF) emissions from personal computers that we brought to the fore in our July issue. I never would have thought 14 months ago, when proposing that *Macworld* address the issue, that we would find ourselves in the midst of an object lesson on how our government deals with—or more aptly, muddles through—the development of public policy.

Our reporting on ELF emissions hit a raw nerve with many of you. The letters, phone calls, and coverage of our articles by others in the media were unprecedented. Yet the amazing aspect of this ongoing story is the ineffectiveness of the federal government with regard to this issue. It is this concern that Deborah Branscum (see *Conspicuous Consumer*) and I address in these pages.

As a result of speaking with Food and Drug Administration (FDA) representatives last May—and having read the EPA's impressive draft report on the subject of ELF emissions from that agency's young turks (which subsequently was and still is being watered down at higher levels)—I had already come to expect stonewalling from federal agencies on the issue of ELF emissions. As a longtime observer of the executive branch of our government, I had no hope it would take an unequivocal position on a complex issue involving health, technology, and public policy. After all, it took the Federal Trade Commission (FTC) 13 years to have one manufacturer remove the word *liver* from its product's appellation (Carter's Little Liver Pills were shown to have no effect on the liver).

CHARLIE ARCHAMBAULT

SENATOR ALBERT GORE, JR. (D-TENN.), CHAIRMAN OF THE SENATE SCIENCE SUBCOMMITTEE, AGREED TO HOLD SENATE HEARINGS

After withstanding decades of bombast about the reduction of crime in our cities, the successful waging of war on drugs, the elimination of poverty, and the myriad other political promises to better our society, few of us have illusions about the effectiveness of our government. But it takes the abrupt interruption of something in our daily lives to remind us what the impact of our society's inexorably increasing complexity will be. Our July issue caused such an archetypally rude awakening.

We raised issues of science policy, a bailiwick only rarely visible in the public eye. But more important, we encroached upon the political morass of public health policy and upon the domain of regulation covering public utilities. The process of justifying the technology issue we raised as one meriting national attention would have been difficult enough. The addition of lobbyists and vested interests related to health and electrical power

*(continues)*

WIDE WORLD PHOTOS

CONGRESSMAN GEORGE BROWN (D-CALIF.) INTRODUCED AN APPROPRIATION BILL TO FUND ELF RESEARCH

almost guaranteed the assignment of the ELF issue to political oblivion in a national arena. At most it would have been consigned to that political swamp of the never-ending interagency task force, the blue-ribbon panel, or the investigative committee.

Few doubted, or if they did, could adequately defend before public scrutiny their criticisms of the argument that ELF emissions are a valid issue of concern. Even the EPA draft document cites over 40 studies relating ELF emissions to possibly negative impact on human health.

Our challenge was how to bring enough attention to bear upon the issue to cause regulatory agencies to promulgate standards. Therein lay the lessons we were about to learn with regard to public policy.

**Public and Private Justification**

One of the great shocks we received during the height of discussion on the subject was Apple Computer's public relations department's citing of statements from public health organizations and associations to the effect that ELF emissions do not present a health concern. In statements on CBS and CNN Apple frequently cited the American Medical Association (AMA), the American College of Obstetricians and Gynecologists (ACO&G,) the World Health Organization (WHO), and others.

After some digging I was able to determine that the International Radiation Protection Association (IRPA)—a group associated with, but not part of, WHO—had an interim standard for ELF emissions *thousands* of times in excess of the field strengths questioned in many studies.

Discovery of IRPA's unrealistic standard set us out on the trail to ask how the other public organizations and associations cited by Apple could take the stance that there are no problems with ELF emissions—especially in an era when a group such as the American Bar Association finds it inappropriate to even publish an opinion about a subject such as abortion. How could the AMA and others take a stance on an issue so little understood as ELF emissions? Despite troubling research, both the AMA and the ACO&G continue to assume, in effect, that personal computers are safe. An amazing stance, given the movement toward concern over ELF cited by our consumer columnist at both the FDA and the EPA.

**Congressional Interest**

The Electrical Power Research Institute (EPRI); the Council on Office Technology (COT), a lobbying group funded by the Computer and Business Equipment Manufacturers Association (CBEMA); and others have been cited as sources of repute and agreement that ELF emissions do not present reasons for concern. Similarly, eminent scientists (whose funding from the electrical power industry has received little publicity) have also been cited as credible sources by those belittling ELF emissions as a genuine concern.

We, the editors, found ourselves facing well-coordinated, efficient public relations and lobbying organizations put into place over the last several decades by one of the most powerful interest groups in our nation: the electrical power industry. I had not reckoned that in taking a stance on this issue we were also taking a position that might cause this group to bring its considerable resources to bear.

**Congressional Activity**

Despite the clout of the electrical power industry, a window of public scrutiny on the issue was briefly opened as a result of the coverage given to our July issue and to articles in the *New Yorker* by Paul Brodeur on the relationship of power substations to cancer clusters in several suburban areas.

Just before the publication of our July issue I visited with Senator Albert Gore, Jr. (D-Tenn.), chairman of the Senate Subcommittee on Science, Technology and Space. After a briefing on the issue, he agreed to hold hearings in the Senate on the subject. The senator hedged the promise before we parted, but I had hope that he would take some action. He had already demonstrated a concern about the issue, as a congressman and as chairman of the House Subcommittee on Oversight of Science and Technology, during hearings on the subject of ELF emissions in 1981.

Gore, as you may remember, made a strong run for the Democratic nomination for the presidency in 1986.

*(continues)*

WIDE WORLD PHOTOS

DAVID NAGEL OF APPLE COMPUTER SPOKE IN FAVOR OF NATIONAL ACADEMY OF SCIENCE RESEARCH

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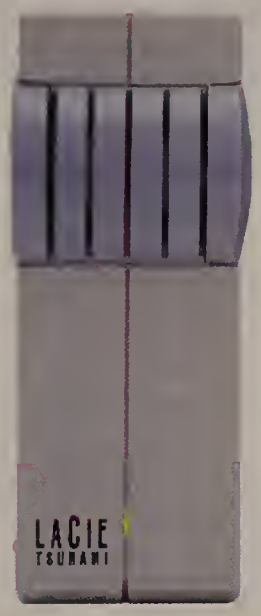

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At best he is a man in a delicate position, torn between a strong record on consumer issues and the requirement to represent the economic interests of his constituents (he is from a state that is home to the Tennessee Valley Authority, which earns $5 billion a year in revenues from electrical power generation, and home to the majority of its 26,000 employees).

Gore's professional staff director on the science committee was more than a little skeptical about ELF as an issue. So even at the outset I had some fear that the issue might become lost in a maze of budget reconciliation and this fall's reelection concerns.

At press time it was not surprising that the Senate Science Committee staff could only report . . . no activity, check again next session.

DAVID BARRY

LOUIS SLESIN (ABOVE) HAS CITED DR. WILLIAM FARLAND AS WATERING DOWN THE EPA DRAFT REPORT

### House Hearings

Much to our surprise, our articles received wide coverage on Capitol Hill. Several committees and subcommittees wrote or called to ask for copies. In combination with the national media coverage of our July issue and of Brodeur's *New Yorker* articles, the House of Representatives conjured up some concern at hearings held in July on two funding bills for further research on the subject. One was introduced by Representative Frank Pallone (D-N.J.), whose district includes one of the cities mentioned in Brodeur's article.

Congressman George Brown (D-Calif.), a wily veteran of 14 congresses, introduced a more pragmatic appropriation bill to fund ELF research within the Department of Energy. Congressman James H. Scheuer (D-N.Y.) chaired the hearings on both bills.

Television cameras were rolling in the House hearing room as representatives from the Department of Energy, the Environmental Protection Agency, and others testified in support of the bills. David Nagel, vice president of Apple's Advanced Technology Group and a veteran of 19 years of federal service at NASA (and the sole representative of the personal computer industry), made a startlingly firm statement on behalf of further research, and spoke in favor of having the National Academy of Sciences oversee such research. Nagel, or Apple's public-relations speech writers, handily avoided associating potential harm from ELF emissions with personal computers in his prepared testimony.

The few sparks that flew came when Chairman Scheuer questioned Dr. Ross Adey on why the National Cancer Institute had allowed its staff to testify about ELF matters on behalf of electrical power utilities. There was potential for real muckraking on the topic when Dr. Adey asked how scientists in the employ of the federal government could be allowed to accept substantial payments from utilities and manufacturers in order to testify on behalf of the position of public utilities. But no member of the subcommittee pursued that line of questioning.

In related comments to the press during the hearing, Louis Slesin was quoted as citing the actions of Dr. William Farland, a noted (and inaccessible) bureaucrat, in watering down the EPA draft report. Slesin, publisher of *VDT News*, is the longstanding voice of concern on this is-

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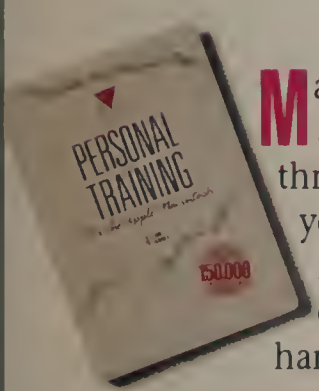


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sue, having spent 10 years covering the topic.

**Manufacturers**

Meanwhile, both before and following the hearings, I had numerous discussions with Apple's third-party developers. RasterOps, Radius, SuperMac, Sigma Designs, and MegaGraphics were outspoken at an executive level with their concern about the ELF issue. Sigma Designs gained national attention by going on record with an announcement of intent to build the first monitor with lowered ELF emissions. I became convinced that the third parties genuinely want to develop technology that will ameliorate ELF emissions. They really want some standard or guideline to build toward. Although some derision was hurled in my direction by certain manufacturers' marketing and engineering staffs, every one of the presidents—as those responsible for the financial well-being of their companies—came down on the side of building products with lowered emissions.

**The Litigation Bogeyman**

August saw a notable first: the announcement of product litigation on the subject, when the *Wall Street Journal* reported that Boeing had settled out of court a case brought by an employee alleging that his leukemia was caused by exposure to ELF fields. And that is the realm most feared by manufacturers, for tort law is notoriously uncertain. No manufacturer wants to go into open court with a jury listening for months to expert testimony (à la Johns-Manville) about the possible impact of ELF emissions on human health. No matter what the conservative opinions are in trade or lobbying associations, no company wants to try and defend itself against such an issue.

As with asbestos, concerns with ELF emissions center upon long-term effects on humans exposed to ELF fields. Manufacturers working in the absence of a federal standard face product liability issues "downstream." They rightfully look toward the executive branch and its associated regulatory agencies for guidance, but none has been forthcoming.

WIDE WORLD PHOTOS

REPRESENTATIVE JAMES H. SCHEUER ASKED WHAT IT WOULD COST ONE STATE TO REMOVE ELF EMISSIONS. THE ANSWER: $5 BILLION

Such policy or guidelines are unlikely, for in promulgating such a policy, a federal agency would also (by implication if not by specific regulation) indict the ELF electromagnetic fields emitted by power substations and power lines. The implication is that if there is federal regulation on ELF emissions from one area of technology, ELF emissions from other areas would also have to be regulated. During the House hearings, Representative Scheuer asked one of the speakers to estimate what it would cost to remove ELF emissions from areas of likely human impact in just one state. The answer was that it would take $5 billion to bury or remove power lines, or otherwise lessen human exposure to ELF fields, in Florida alone.

The congressman pursed his lips and expressed concern that with our economy under siege from other well-planned federal oversight areas such as the savings and loan industry, Florida might not be able to stand the stress of such a burdensome cost right now. He then noted for all in the room that it would be very difficult to calculate the likely impact of such a huge

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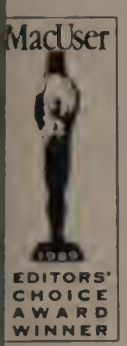


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financial burden on our society and the trade-off in benefits to human health—and which costs our society was more likely to be able to deal with.

**A Call for Action: Please Write**

So there we were. All dressed up and nowhere to go. As computer magazine editors, we ordinarily deal with more esoteric issues buried in elaborate technical detail, such as software copyright, graphical user interfaces, and patents on VLSI design in silicon. But for the first time in my recollection, personal computers have become a topic of broad national concern.

We of the groups that make up the users of personal computers must all act to insure that our concerns are put on the agenda of public policymakers. For that reason *Macworld* has taken the unprecedented step of adding a pair of write-in cards to every one of the over 500,000 copies of this December issue. One set of the postcards is addressed to Senator Albert Gore, Jr., and to Representative Robert A. Roe (chairman of the House Committee on Science, Space and Technology); the other set is addressed to Dr. Allan Bromley, science adviser to the president, and to Senator Barbara Mikulski (chairwoman of the Senate Appropriations Committee that oversees the executive branch and regulatory agencies that have responsibility for areas of technology such as ELF emissions).

I encourage you to assist in moving this issue further into the public eye by filling out the attached cards, adding a stamp, and walking them to a postbox. You might also consider writing directly to your own representative and senator to express your concern.

And meanwhile, a new generation of children continues to grow up in close proximity to personal computers. The majority of *Macworld* readers are longtime users of personal computers. If ELF emissions do prove to impact our health, we have already been exposed to these fields for years.

We continue to sit and be confused as to why multiple government reports and many privately supported reports that indicate that ELF emis-

*(continues)*

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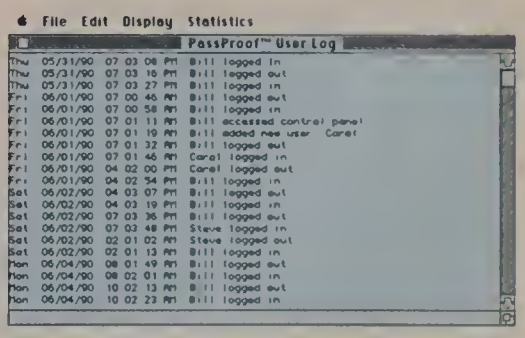


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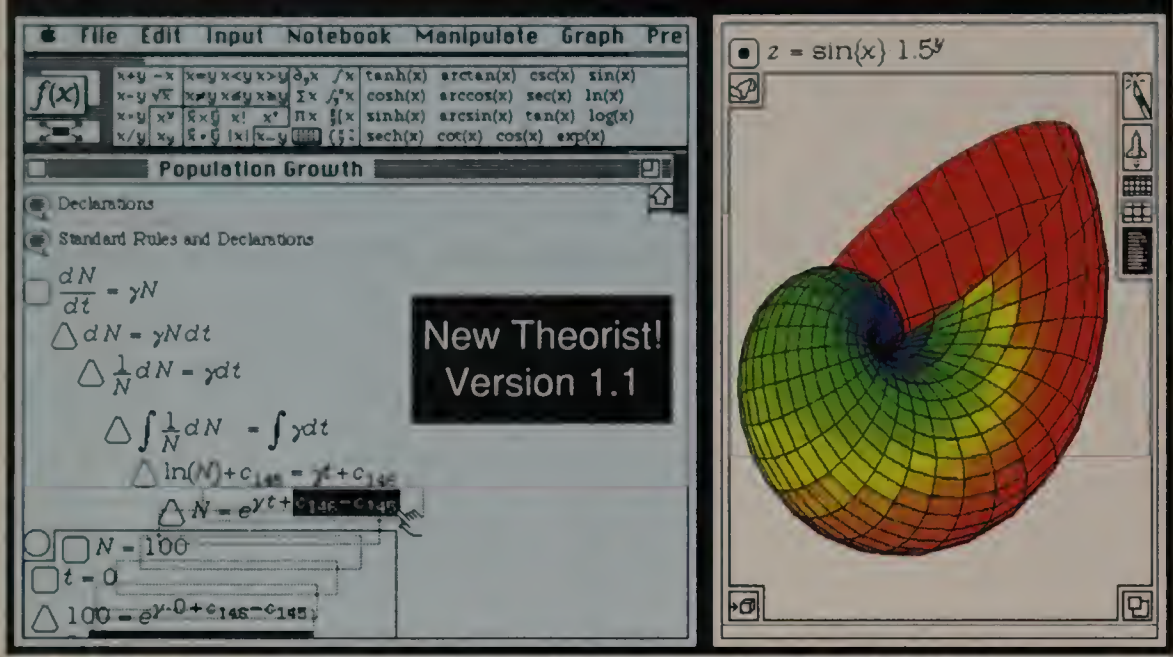


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sions may be a problem must be followed up by additional reports. By animal studies. By more hearings, and more equivocal results. After some thought, and given the slim likelihood that some regulatory body such as the FCC will soon be called upon to measure the output of ELF fields from personal computer monitors, I support David Nagel's call for a National Academy of Sciences–supported study. NAS is probably the most objective, independent policy-analysis group that advises the executive branch of our government.

Perhaps it is possible to address the issue of ELF emissions from personal computers without the need to regulate power line and substation emissions, and thus without confronting an even more effective body of lobbyists.

**Here are my recommendations:**

- Develop an interim standard of the lowest practical ELF field strength manufacturers can reach, and publish this in 1991.
- Recognize that researchers funded by the electrical power industry may be biased.
- Fund research with the National Academy of Sciences, by the most objective panel that can possibly be constituted.
- Support long-term studies already under way such as the Mt. Sinai Hospital study covering pregnant women.
- Centralize responsibility for ELF research in one federal agency.

I have added the national science adviser to our list of postcard names because of an indication earlier in the year in *Business Week* that this adviser has more access to, and greater influence with, President Bush than the previous adviser had with President Reagan. At least Dr. Bromley may have the ability to compete with the reported lack of interest in this issue by White House Chief of Staff John Sununu.

The truth of the matter is that someone with clout has to step forward and become responsible—that is, have his or her name associated with a controversial position on ELF emissions. And that, my friends, is unlikely in the Washington, D.C., of the 1990s. ◻

Dear Dr. Bromley,

I am writing to express my concern about the federal government's lack of activity on the issue of ELF (extremely low frequency) emissions from personal computer monitors. I urge you in the strongest possible terms to direct the appropriate groups within the Food and Drug Administration, the Environmental Protection Agency, OSHA, NIOSH, and the Department of Energy to develop an interim standard that will limit the exposure of users of personal computers to ELF emissions.

SIGNED

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Dear Mr. Roe,

I am writing to express my concern about the federal government's lack of activity on the issue of ELF (extremely low frequency) emissions from personal computer monitors. I urge you in the strongest possible terms to direct the appropriate groups within the Food and Drug Administration, the Environmental Protection Agency, OSHA, NIOSH, and the Department of Energy to develop an interim standard that will limit the exposure of users of personal computers to ELF emissions.

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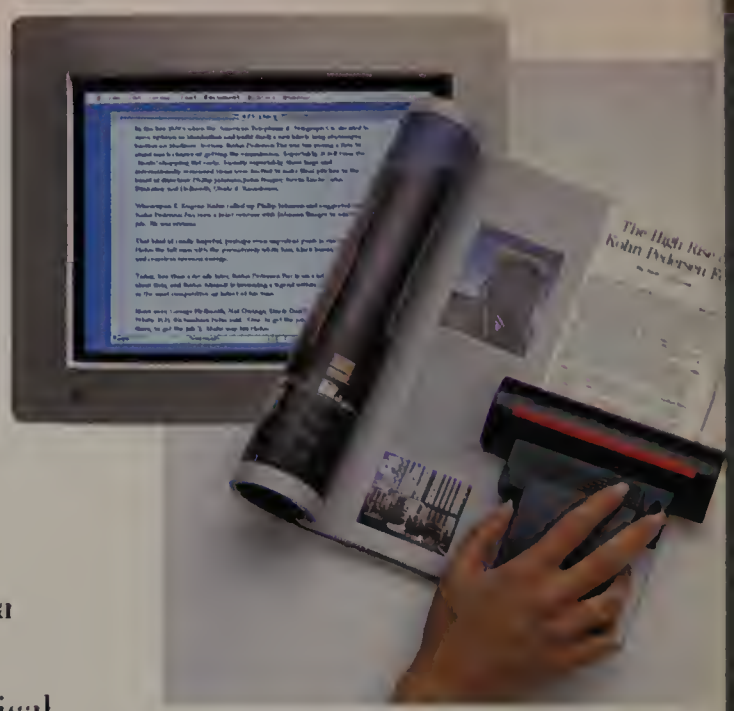

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Circle 362 on reader service card

# *I'm good at desktop publishing. But desktop accounting scared me.*

*The thought of doing bookkeeping for my design studio got me uptight.*

When I heard "balance sheet," I broke into a sweat. I know type, advertising, printing. Now I was forced to do our books.

No choice.

We were on our third part-time bookkeeper in eleven months, and she was called away suddenly. Sound familiar?

But I'm the boss and the buck stops with me. We had bills to pay, payroll checks to write, invoices to send, taxes to set aside.

And deadbeats to collect from–only I had no idea who owed us how much or for how long. Some suppliers may have even thought of *us* as deadbeats. I needed to know our cash flow, and get a handle on all this. But I didn't have a lot of time.

Step one: find an accounting program that feels as familiar as our Macs, that starts out easy, but has lots of reserve firepower for later on.

I found atOnce! The manual looked orderly. I dug in...

**The familiar with the unfamiliar**

atOnce! starts you off with a tutorial that uses HyperCard, one of my old favorites. I was at home.

Numbers are my nemesis, but the tutorial was actually fun and got me comfortable. It takes you step by step through the program, and gives you some easy-to-swallow accounting basics so you're not reading a foreign language. There's context-sensitive help, just in case.

And while you learn, you can start to set up your books. So it doesn't come in a flash and you sweat a little. But you do it and you learn.

I started off light. Double-clicked on one of the default charts of accounts and my General Ledger was practically set up for me. Then entered a few client names in Accounts Receivable, to get an idea of what was coming in. Prepared six invoices–and atOnce! calculated sales tax. Nice. Printed the invoices which I redesigned in atOnce!–realign a field here, change a font there. The usual.

Then ran a Customer Aging Report to identify the slow-payers (I had no idea such a terrific thing was even possible).

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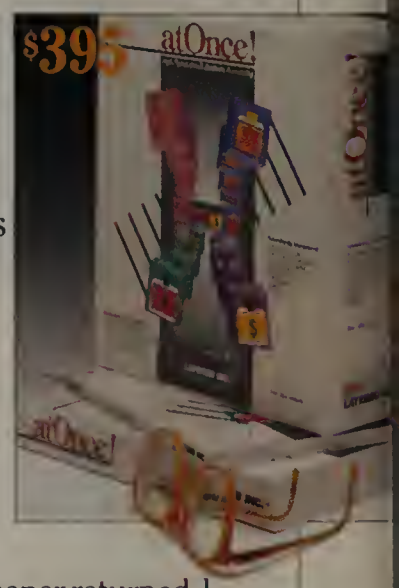
*1990 World Class Award*
***MacUser:***
*1989 Editor's Choice Award and 4.5 mice*

***30 days free support***

*30-Day Money Back Guarantee if you bought it from Peachtree. You can get your money back, minus a $25 re-stocking fee.*

**What I didn't know was costing my company**

I discovered a key client who hadn't paid in two months. I called and collected and now *he* wants to know about atOnce! I wrote payroll checks for the staff, and sent our bank a balance sheet I printed out myself–no sweat.




From fear and loathing to passion. Now I even study the management reports atOnce! generates.

I'm still an art director. But atOnce! helped me become a better businessman!

**A hidden bonus that made my day**

When our bookkeeper returned, I showed her atOnce! Now she's back doing the books, even makes sure my plants are green, and I can supervise like a boss should. Putting the books on the Mac gives me the numbers I need when I want them. It lets me take control of income and expenses.

Here's some free advice: Take control of your *own* business. Buy atOnce!

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**Circle 100 on reader service card**

# LETTERS

PETER ALSBERG

### If You Want It, Buy It!

As a Mac developer who relies on software sales for my income, I ask the Mac community, do you buy the software that you use, or do you simply copy it from your friends?

Please consider your actions! Software developers have to make a living, and if the Mac market doesn't improve, switching to the more lucrative IBM market seems like the only way to go. Yes, the Mac is the better machine by far, but please support the developers by actually purchasing the software that you use.

*Roland Gustafsson*
*San Mateo, California*

### Parallel Onlines

David Pogue's experience and opinions of the various online services ["Life Online," September 1990] paralleled mine. I have access to GEnie, CompuServe, Medline, AMANET, Dow Jones, and Knowledge Index (Dialog).

Of these, the easiest to use is Knowledge Index. It has an excellent manual and easy-to-learn commands that work well with all the databases. One can access them, find the desired information, and log off without running up a large bill.

The major problem with online services is a lack of standardization of commands. In CompuServe you must know certain commands to get to databases, other commands to move around within a database, and so forth. Using the menus is very slow and involves much repetition. Meanwhile, the clock continues to tick, adding charges to your bill. CompuServe's manuals are also complicated. My experience in trying to locate—and get information on—a file in a CompuServe library has been the same as Pogue's.

If online services are ever going to appeal to a large segment of the population, they are going to have to become more user friendly. It's essential to have industry standards for commands so they'll be usable within all services and databases. I have neither the time nor the desire to get out a manual each time I want to access a database. Offering software specific to an online service does not address the problem—it just means more money for the service. Standardization would eliminate the need for software fixes and patches (and more money spent by the consumer). In turn, more people would be likely to use the services and thus increase their revenues.

*Joe L. Brown II*
*Jackson, Tennessee*

### Online Rate Changes

Your well-written article "Life Online," which reviewed seven major online services, suggests what we at Delphi have known all along: Delphi is not the largest online service but rather, one of the friendlier services to use. We also feel that Delphi provides the best value for the consumer, and now our rates have become even more competitive.

As of September 1990, Delphi began offering two membership options: the 20/20 Advantage Plan, which provides 20 hours of usage for $20 per month, and the Basic Membership Plan, with an hourly rate of $6 and a $5.95 monthly fee, with the first hour free.

*Robert C. Adams*
*General Videotex Corporation*
*via AppleLink*

Most of the other online services have also made important changes since "Life Online" appeared. CompuServe's Information Manager, an inexpensive program that gives the text-based service an intuitive, graphic Mac interface, is now available. Prodigy now offers faster performance for hard drive owners, more text per screen,

*(continues)*

### Corrections

*The following features are available in Microsoft Excel ("Top of the Charts," July 1990): lines without arrows, overlay charts, hi-lo charts, and data links with graphs or external files.*

Canned Art: Clip Art for the Macintosh *(Peachpit Press, 1990), mentioned in "Mac Art Mart" (October 1990) was not listed in* Where to Buy. *Peachpit Press's numbers are 800/283-9444 and 415/527-8555.*

*The Electronic Color Splitter, from MicroSearch* (New Products, *July 1990), retails for $199.95.*

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and new services, and the company hopes to add downloading capabilities soon. Prodigy's monthly rate has increased to $12.95 for unlimited usage (one-year subscribers pay the equivalent of $9.95 per month; two-year members only $8.33). GEnie has greatly reduced and simplified its pricing scheme: $4.95 per month buys unlimited off-peak connect time, with access to the majority of online features. A new lower hourly rate ($6) is billed only for time spent in the computing forums and software libraries. (Peak rates remain at $18 per hour.) America Online has overhauled its bulletin board system, making it easier to spot and respond to messages you haven't yet read.—Ed.

### MIDI Oversight

Getting Started with MIDI" in the August issue mentioned several very good MIDI sequencers for the Macintosh but failed to mention Rhapsody by Green Oak Software (619 434-0823). It compares favorably with the high-end sequencers covered by the article, but at only $150, Rhapsody is a real bargain.

Rhapsody is very reliable (bug free) and has never been copy protected. Green Oak provides excellent support and has upgraded the program twice in the last six months. The latest version (2.1) contains over 20 new features and additions.

*Dwight Stewart*
*Myrtle Beach, South Carolina*

### Judgment Call

I read and enjoyed your "Word Processor Olympics" (September 1990) but to my great surprise, it did not contain any judgment criteria based on features per dollar. Ashton-Tate's FullWrite Professional 1.1 can be had at most mail-order companies for about $45. The overall Olympics winner, Microsoft Word 4.0, is about $250 at the same discount houses. In keeping with *Macworld*'s value-minded tradition, "Word Processor Olympics" should have mentioned the rather huge price difference between the two. FullWrite should at least have been awarded another gold medal and proper recognition in the "Winners' Circle" on page 179.

*Geoffrey P. Krug*
*Painesville, Ohio*

You're right on both counts. Such a large price discrepancy should have been pointed out, and there was an error in the "Winner's Circle" chart—FullWrite (not WriteNow) placed second in overall medals.—Ed.

### Testing 1, 2, 3

An incorrect statement regarding hard-drive testing procedures appeared in "Surveying the Shakeout" (*Conspicuous Consumer*, September 1990). In discussing vendors that inspect 100 percent of their incoming mechanisms, the column reads, "Microtech International, on the other hand, tests only a random sample of 25 percent of its drives, unless a problem is found."

Every Microtech International drive is 100 percent tested before it is packaged. Microtech's product-quality control and assurance is performed in a three-step process: (1) Approximately

*(continues)*

Circle 28 on reader service card.

# Someone Has Some Explaining To Do.

*The Mirror Trinitron uses Sony's patented Trinitron tube for the sharpest color image available.*

*The Mirror Trinitron comes with an 8-Bit Interface (MacII or SE30) that delivers 256 vivid colors, and software enhancements like Pop-up Menus, Enlarged Cursor and Menubar options, Screen Saver, and Screen Copy.*

*The Mirror Trinitron is available direct from the manufacturer without any Rep commissions or Dealer mark-up.*

*The Radius Trinitron uses Sony's patented Trinitron tube for the sharpest color image available.*

*The Radius Trinitron comes with an 8-Bit Interface (MacII only) that delivers 256 vivid colors, and software enhancements like Tear-off Menus, Enlarged Cursor and Menubar options, Screen Saver, and Screen Copy.*

*The Radius Trinitron is only available through authorized Radius Dealers.*

## There Had Better Be A Good Reason To Pay 47% More!

We've long admired the Radius Trinitron Color Display. That's why when we designed our first color display system, we chose to include many of the same concepts. Such as Sony's patented Trinitron tube which is now the defacto standard for the Macintosh. And an 8-Bit Video Interface that delivers 256 colors. And software enhancements like Enlarged Cursor, Enlarged Menubar, Screen Saver, and Screen Copy. And a built-in tilt and swivel base.

## So Where's The Difference?

The fact is, in deference to Radius, we've had a much longer time to design a color display. That's why we've been able to build in some important differences. Here are just three:

1. Our ProView Interface delivers 256 color at 72dpi for true WYSIWYG scale so that the image on screen is the same as what you'll get from your printer.

2. Our Pop-up Menu feature is the next logical upgrade to Tear-off Menus, and our Stroke feature saves you both mouse and keyboard time.

3. **FREE!** We are including VideoPaint from Olduvai for a limited time at no charge! VideoPaint is the professional color painting and retouching application that was rated 5 mice by MacUser France.

## The Big Difference: You Pay 47% Less When You Purchase Factory-Direct

Why pay all of the additional marketing expenses plus the dealer's profit? We've made installing and using the ProView Trinitron so easy that there's no reason to pay a dealer's 40% margin. Technical support is only a phone call away. (And who better to ask about a product than it's maker!)

## Compare For Yourself!

| | Radius | Mirror |
|---|---|---|
| 20" Trinitron | Yes | Yes |
| 8 Bit/256 Colors | Yes | Yes |
| WYSIWYG scale | No | Yes |
| Pop-up Menus | No | Yes |
| Tear-off Menus | Yes | No |
| Enlarged Cursor Option | Yes | Yes |
| Enlarged Menubar Option | Yes | Yes |
| Screen Saver | Yes | Yes |
| Screen Copy | Yes | Yes |
| VideoPaint ($495 value) | No | Yes |
| Dealer Markup | Yes | No |
| **LIST PRICE** | **$5690** | **$2997** |

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25 percent of all incoming drive mechanisms and other components are tested to ensure they meet specifications. If they do not, the entire shipment is refused. (2) The components then enter the manufacturing assembly process, where the entire product—including the drive mechanism and all components and software added to that point—is inspected and tested at each station in the process. Therefore, 100 percent of each product is inspected and tested at the last workstation before it is packaged for shipment. (3) After the product is packaged and sealed, the quality control inspector then pulls from the warehouse area a random sample of 25 percent of each production run, to ensure that each step of the assembly process has been adequately performed. This ensures that the final quality-control inspection is performed on a true random sample of drives.

While we understand how, from your conversations with Microtech International personnel, you came to make the statement that you did, the net result is that the statement is not accurate.

*Michael J. Zanoni*
*Ramm Public Relations*
*Cranford, New Jersey*

### It Didn't Sound Right

The article "Best Buys in Low-Capacity Drives" [September 1990] contains a sidebar that measures the noise level of the various drives tested. Its introductory statement incorrectly reads "For every 3-decibel increase, humans perceive sound to be twice as loud." It should read "For every 10-decibel increase . . ." The 3-decibel increase refers to the sound intensity, not to the perceived loudness of the sound.

*Donald D. Snyder*
*Professor of Physics*
*Indiana University*
*South Bend, Indiana*

Sorry for the confusion. Thanks for setting the record straight.—Ed.

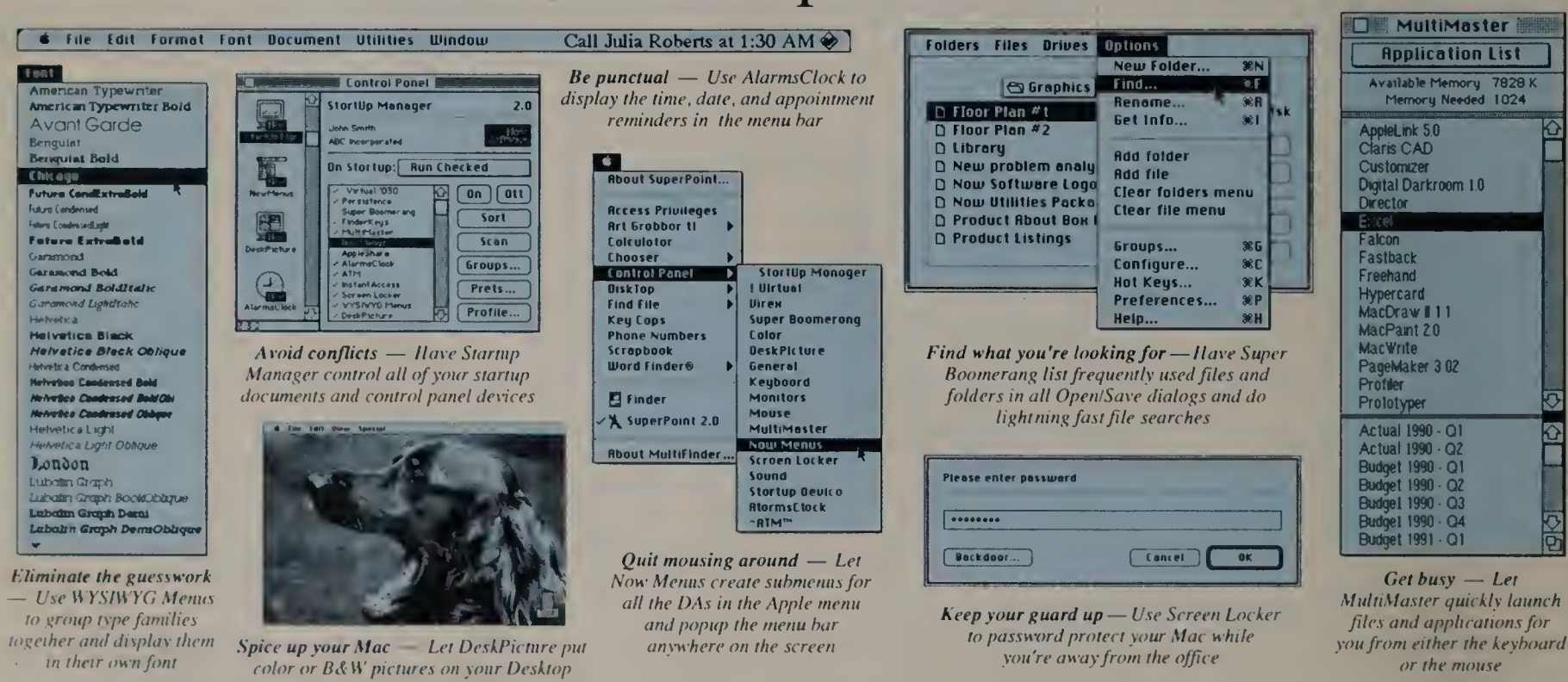
### A Little Help from Macworld

I had been trying to decide whether to subscribe to *Macworld* or *MacUser*, since both offer lots of useful information and entertainment. However, Apple made the choice for me—I was given a free one-year subscription [to *Macworld*] by Apple when I registered my Mac Plus. But even if that had not happened, I would have chosen *Macworld* after reading "With a Little Help from My Mac" in the September 1990 issue, about Macs being used to aid disabled people in regaining normal, productive lives.

The article was especially important to me, as I have a very dear friend with cerebral palsy and I am a longtime supporter of the Muscular Dystrophy Association, which treats ALS patients such as Liz Vantrease. Reading it actually brought a tear to my eye, a lump to my throat, and a fierce pride to my heart as a Mac user. These applications of the power of the Mac bring a whole new meaning to Apple's slogan, "The power to be your best." Thank you,

*(continues)*


# Hard disk utilities give you SUM of what you need, Now Utilities 2.0 provides the rest.




*Eliminate the guesswork — Use WYSIWYG Menus to group type families together and display them in their own font*

*Avoid conflicts — Have Startup Manager control all of your startup documents and control panel devices*

*Be punctual — Use AlarmsClock to display the time, date, and appointment reminders in the menu bar*

*Spice up your Mac — Let DeskPicture put color or B&W pictures on your Desktop*

*Quit mousing around — Let Now Menus create submenus for all the DAs in the Apple menu and popup the menu bar anywhere on the screen*

*Find what you're looking for — Have Super Boomerang list frequently used files and folders in all Open/Save dialogs and do lightning fast file searches*

*Keep your guard up — Use Screen Locker to password protect your Mac while you're away from the office*

*Get busy — Let MultiMaster quickly launch files and applications for you from either the keyboard or the mouse*

Products like SUM let you get the most out of your hard disk. Now Utilities lets you get the most out of your software. As *MacWorld* put it, "This collection of 12 programs really does have something for everyone." In addition to everything pictured above, Now Utilities 2.0 includes two Finder enhancement utilities, a facility for previewing documents before you print them, and a system profiler. In short, it gives you everything you need to get the most out of your Macintosh...in one box, with everything guaranteed to work together, for only ***$129***. The result? According to *MacUser*, "you'll become more productive and probably have more fun." And isn't that why you bought a Mac in the first place? Call us toll-free at ***1-800-237-3611*** to learn more about what Now Utilities 2.0 can do for you.

Now Software™

Now Utilities, AlarmsClock, DeskPicture, MultiMaster, Now Menus, Screen Locker, StartUp Manager, Super Boomerang and WYSIWYG Menus are trademarks of Now Software Inc.

**Circle 335 on reader service card.**

# You Can Have Fun. Or Get It Done.

The Radius Pivot is a beautifully tooled piece of equipment. It's sexy in design. And it's fun to play with...twisting the screen into a portrait or landscape orientation. But ask yourself, are you buying it for fashion or for productivity? If it's productivity, you owe it to yourself to compare the Pivot to our PixelView II display. Let's compare:

## Which Gives You Extra Viewing Area?

The Pivot's 15" monitor has 30% less screen than our PixelView II 19" display. You pay $18 per sq. in. of viewing area with Radius compared to $6 with PixelView II.

## Which Gives You WYSIWYG Scaling?

The PixelView II maintains true WYSIWYG scale so that what you see on screen is what you see on the printed page. Everything is shrunk down on the Pivot's 15" screen.

## Which Saves You Desk Space?

One of the benefits of the Radius Pivot is that it's supposed to take less desk space. But the Pivot actually takes more space than our 19" PixelView II monitor just to pivot. 20" to be exact. And forget about leaning anything up against it.

## Which Works With A Macintosh Plus, SE, SE30 or II?

Our PixelView II works with the Macintosh Plus, SE, SE30, and any Macintosh II. The Pivot does too, but the pivot feature (that you pay so dearly for), doesn't work on the Macintosh Plus or SE.

## Which Saves You 47%?

Unlike Radius, you can purchase your PixelView display system direct from the factory. That means savings. No middleman. No retail mark-up. That's why you pay 47% less for our PixelView II.

## Now You Have A Lot Of Good Reasons To Pay Less!

Let's face it, you buy a large screen display to improve your productivity. A quick comparison will reveal that our PixelView display offers more productivity for your money.

## If Budget Or Deskspace Are Really Tight...

Our PixelView I 15" portrait display was designed to take a minimum amount of deskspace, while giving you a full page on screen. And of course it works with any Macintosh Plus, SE, SE30, or II.

## Compare For Yourself!

| | Radius Pivot | Mirror PixelView II | Mirror PixelView I |
|---|---|---|---|
| Screen size | 15" | 19" | 15" |
| Viewing area (sq. in.) | 90.77 | 151.58 | 90.77 |
| WYSIWYG (72 dpi) | No | Yes | No |
| Vertical refresh | 69 | 78 | 75 |
| Pop-up Menus | No | Yes | Yes |
| Tear-off Menus | Yes | No | No |
| Enlarged Cursor | Yes | Yes | Yes |
| Enlarged Menubar | Yes | Yes | Yes |
| Screen Saver | Yes | Yes | Yes |
| Screen Copy | Yes | Yes | Yes |
| Full year warranty | Yes | Yes | Yes |
| Dealer markup | Yes | No | No |
| **LIST PRICE** | **$1690** | **$897** | **$567** |

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Circle 341 on reader service card

W15a

Brita Meng and the editors, for bringing me this article. You've just won over another new loyal reader.
*Matt Leger*
*Arlington, Virginia*

### LightFax Update

We appreciated the inclusion of our LightFax 9624 fax modem in your article "Fax-Modem Influx" in the August 1990 issue but would like to update some information that has changed since then. We are currently shipping version 2.0 of the LightFax Macintosh software, which provides true background operation when sending or receiving a fax. The modem module, which allows the LightFax to be used as a 2400-baud modem, now comes installed in every LightFax, at no extra charge. The LightFax 9624—now compatible with AppleShare and TOPS networks—sells for $399 including cable and software.
*Calvin Smith*
*Computer Friends*
*Portland, Oregon*

### Mac Loyalist in a DOS World

I have used Microsoft Excel and Word since they came out, and I have been pleased up until now. I do not really like using Microsoft products, mainly because Microsoft is not a Mac-only outfit (it is actually the antithesis of one). But it made some very good products with little or no real competition.

I have tried to find a word processor with the features and speed of Word but couldn't, although More 3.0 and Nisus are coming close. In fact, More 3.0 is so good, I may just use it as my word processor. As for Excel and spreadsheets, well, I tried Wingz but the interface was hard to get used to, so I continued using Excel. I recently encountered a "feature" that so infuriated me that I have finally decided to wean myself of Excel, and hopefully, of all other Microsoft products.

To explain this feature, I have to give a little background. The Mac uses a 1904-based clock, while DOS machines use a 1900-based one (programs like Excel calculate dates based on the number of days from the base date). Well, Excel gives you the option of using either 1904 or 1900 as the base date. So here's the problem: when importing a text file created from a database or another program that saves dates in MM/DD/YY format, Mac Excel automatically changes the default to the 1900-based clock. This means that all the dates appear four years in the past (for example, 7/5/90 would appear as 7/5/86). I thought, OK, I'll just call Microsoft and report the bug.

Here's what infuriated me. Microsoft's technical help line informed me that the program did this on purpose, because the company's market research showed that more people imported files created on DOS-based computers than on Mac-based ones, and Microsoft chose to accommodate the DOS users! When I told them I've been using Excel for four or five years and never imported a DOS

*(continues)*


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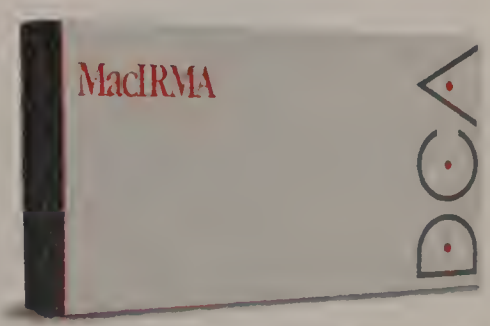


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file, and asked why they changed Excel, since it worked fine before, they informed me that the number of users determines which way the program works. Well, given the number of users there are in the DOS world, I know which way Microsoft will gear further development.

So now I'm searching for a Mac-oriented company with a good spreadsheet. Ashton-Tate was never in the running and Informix's Wingz is now a Windows 3.0 product, so they're suspect too. I wonder how long before they, too, ignore the Mac market?

*Allan Marcus*
*Cupertino, California*

**Valued Verbatim**

Normally I dislike interviews that appear in technical publications, but the interview with James Von Ehr [president and CEO of Altsys Corporation] in your September *Verbatim* is truly an exception to that rule. The interview showed Von Ehr to be both intelligent and eloquent. I thoroughly enjoyed it.

As Jerry Borrell conveyed Von Ehr's responses, I silently began to root for the underdog; then I cheered as Altsys became a winning team. I understand PostScript (and the PostScript Type 1 versus TrueType font technology battles) a little better after reading this piece.

The story of Altsys's success is truly inspiring. It shows that if you have the talent, desire, courage, and tenacity to develop your ideas (whether it be software, hardware, or intellectual property), there is room out there for you to succeed. I hope to see more interviews of this quality in the future.

*Mark A. Stover*
*Davidsville, Pennsylvania*

**Leave Levy Alone**

I don't know Steven Levy personally, but come on, guys, lay off him. Every issue is full of complaints about Steve. Steve did this, Steve did that. If I were Steve's ego, I'd look like hell. Anybody can blather on about this and that, but Levy makes it funny.

After reading his column about the nuPrometheus League [September], I found myself frantically looking for a calendar to confirm that it was not April. I guess I always root for the underdog. But I am sure that if FBI Agent Baxter had enough time, he could discern which one was the Vise-grip. And I know some day he will catch all the members of the "evil" prosthetic group. (If Color QuickDraw can get me into Apple, where will 32-bit QuickDraw get me?)

*Michael J. Sanders*
*Christopher, Illinois*

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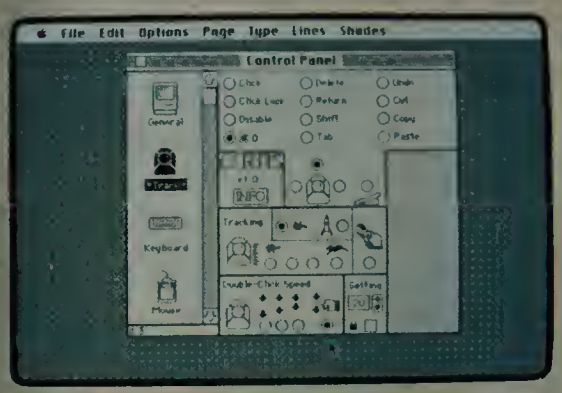


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# ART BEAT

by Cathy Abes

The tools and the talent behind Macworld's graphics and the techniques that make them possible

**Artist:** While in art school, John Craig learned the traditonal technique of wood engraving. He frequently creates collages made from engravings, some of which he scans in and colorizes on the Mac. For "The Santa File," our poetic Christmas-gift feature, Craig created a richly detailed illustration that adds a touch of high tech to an old-fashioned-looking holiday scene.

**Tools:** Mac II (8MB RAM, 80MB internal hard drive), Microtek MSF-300Z scanner; PixelPaint 2.0.

**How It Was Done:** Craig collected various engravings that contained elements he wanted to use in his illustration. The room—with the fireplace and stockings, the mistletoe, and the snow—came from one engraving, the Santa from another, and the man in the chair from a third. After pasting these black-and-white images together, Craig scanned in the collage plus some extra elements—the keyboard shape, the monitor shape, and the radiating lines emanating from it—from three other engravings. To preserve as much detail as possible, he scanned the images at 150 percent and saved them as TIFF files.

After converting the images to PixelPaint 2.0 files, he lassoed the images of the monitor and the emanating rays to bring them into the main collage.

Now it was time for a little arm twisting. In the original engraving, the man's right arm was upright, holding a book. Craig wanted the elbow to lie on

*(continues)*

The original collage is scanned in to PixelPaint (left). A duplicate of the arm is first lassoed out, then rotated, and surrounding background is erased (right).


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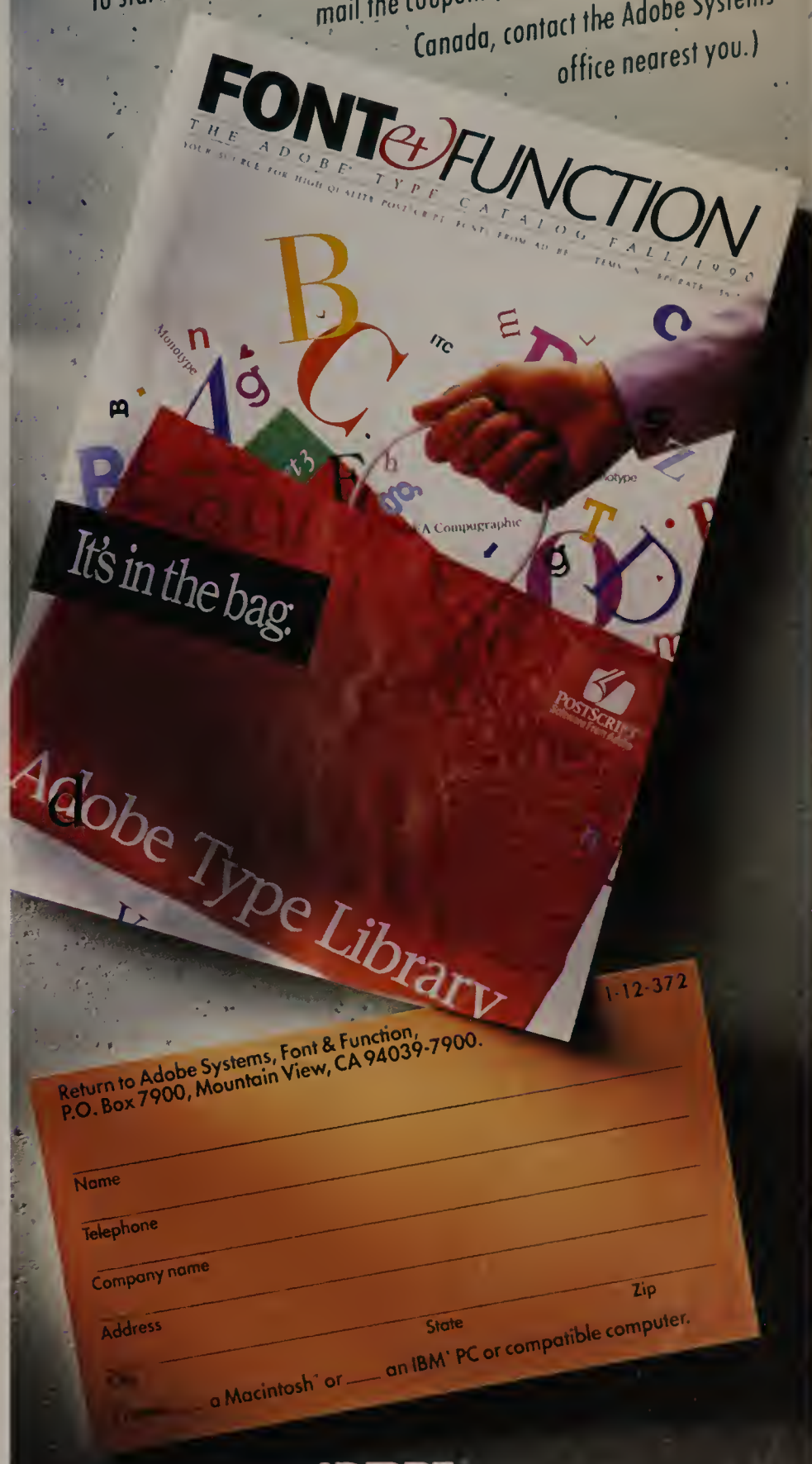


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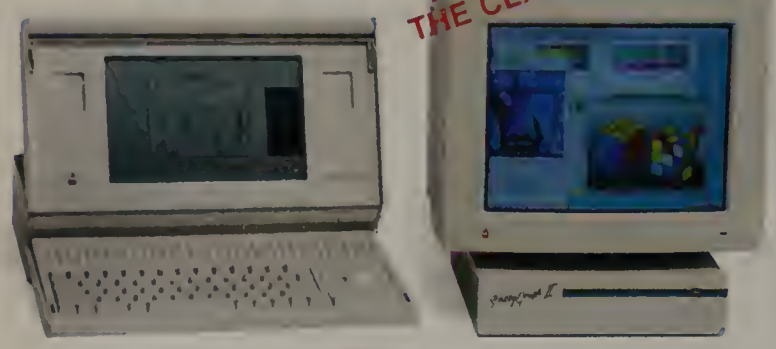

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The rotated lower arm is pasted back into the illustration (left). (Note: The cream color has been added here—out of order—to illustrate the first stage of the colorization process.) The final image after cleanup and colorization (right).

the arm of the chair and the hand to rest on the shape (that would later become the keyboard) he'd placed in the man's lap.

To make a copy of the arm without leaving a hole in the illustration, he lassoed and dragged it out of the illustration while holding down the Option key. Working on the duplicate arm, he erased the book (which obscured the upper arm) and, using the pencil in zoom mode, cut away the area around the arm from the hand to the elbow, leaving a black outline around it. Using the Rotate Right command, he rotated the arm 90 degrees; then he lassoed it and pasted it back into the illustration so the hand now rested on the keyboard. By erasing, redrawing, and lassoing textures from the chair and the man's suit, he patched the area until he'd covered up what remained of the original arm.

After doing some general cleanup in black and white—enhancing lines and adding highlights—he selected PixelPaint's 16-hue color palette. Craig says that when working with black-and-white engravings, he prefers to use darker colors for the black areas of the engraving and lighter tints for the white areas. That way he's able to maintain the look of the original piece even while working with a full range of colors.

Using the Paint on Lighter Colors option of the special-effects brush, he painted all the white areas a cream color. He chose this shade because of the muting and warming effect it gives to surrounding colors.

Now, Craig began colorizing various black areas, choosing reds, greens, blues, and browns. He once again used the special-effects brush—this time with the Paint on Darker Colors option selected—to apply color. Once satisfied with the basic color scheme, he finished filling in the larger areas and then applied additional colors to the smaller areas. Then he began experimenting with other tints for the cream areas, such as peach skin tones and white highlights. Finally, working with the pencil and spray can tools, he did some color touch-up, including using PixelPaint's flexible palette-customizing features to make some of the colors warmer or darker. ■

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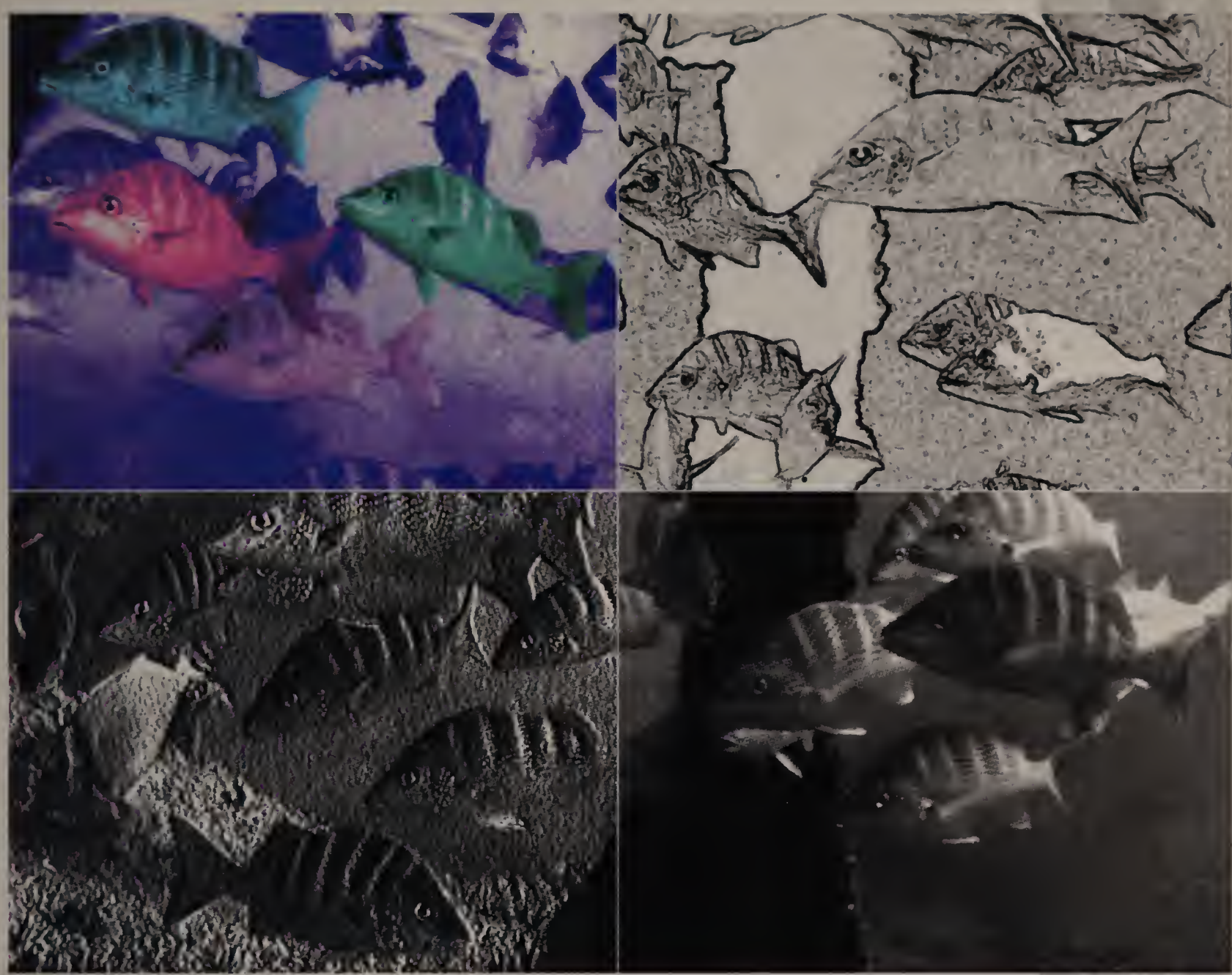

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# *The Soul of a New Macintosh*

## THE TWISTED TALE OF THE MAC LC, THE COMPUTER THAT REFUSED TO DIE

BY STEVEN LEVY

In early 1988 the top executives of Apple Computer had many priorities for improving the Macintosh product line. Making a truly affordable color Mac did not top that list. But fortunately for them—and for us—two unheralded engineers realized that there would be considerable clamor for such an item. They resolved to design a color Macintosh that could be produced at a much more modest cost than the current rage, the IIcx. The result of their labors, as well as the good efforts of literally dozens of Apple workers, is the Macintosh LC, described in detail elsewhere in these pages.

But it was not easy. It was certainly not easy. The road to the Macintosh LC was to be pocked with detours and twists, treacherous obstacles and tempting exits. A stark recitation of the various code names for the project gives an indication of the shimmying course: Charm, Strange, Spin, and, finally, the eponymous Elsie. It took resolve, a steady vision, and even some judicious insubordination to bring the vehicle home, ultimately parking it in the space marked Victory Circle.

Victory, however, was the furthest thing from the minds of Paul Baker and H. L. Cheung in the early days of 1989. Management had just axed their pet project, a color computer called Spin. They had finished the prototype around Christmas and had eagerly demonstrated it to any Apple executive they could collar. They had even gone to Apple's production facilities in Singapore to look into the potential cost of manufacturing the machine. But though Apple's brain trust generally agreed the computer was a fine one, Spin was deemed not enough of a change from previous models to justify a go-ahead. Baker and Cheung had a dead project.

DRAKE SOREY

**The Mac LC team (standing from left to right): H. L. Cheung, Wayne Dyer, Paul Baker, and James Jatczynski. Bill Goins is seated.**

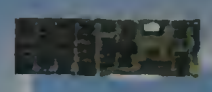
### Baker and Cheung

It was a tough blow for two veteran Apple hands. Baker, now 35, had worked for Apple since 1979, and had spent five years as a key player on the Lisa team before leaving the company to work for the Macintosh's original designer, Jef Raskin, at a company called Information Appliance. When that experience reached its end, Baker returned to Apple, hoping to finally associate himself with a hit product. H. L. Cheung, two years younger, had been the ninth employee Apple hired in Singapore; after immigrating to Cupertino in 1987, he headed the Apple II–family design team. Then he wangled a transfer to the Macintosh side, where the action was.

Since returning to Apple, Baker had been working on a project codenamed XO, putting some of the Mac SE's features on a chip set to be retrofitted into the Mac Plus. Cheung, the manager of Baker's team, was working on two stripped-down modular Macs called Green Jade and White Jade. Those projects fizzled, but the vision behind them made sense: quality Macs for lower cost.

The idea resonated with each engineer's personal orientations:

*(continues)*



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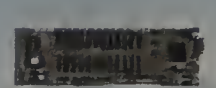

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Baker had two children, and was passionate about Apple maintaining its place in the education market. Cheung was still drawn to the mystique of the Apple II, a computer first conceived as a color machine for The People. So why not a Macintosh iteration? To quote the system description Baker circulated in 1988, the prospective computer would be "a small color Macintosh system based on the Mac II design." He listed the features that would distinguish this machine from its predecessors:

- Small size (single-floppy base configuration is only 90mm tall)
- Single processor expansion slot (no NuBus interface)
- Built-in video subsystem (no Mac II video board needed)
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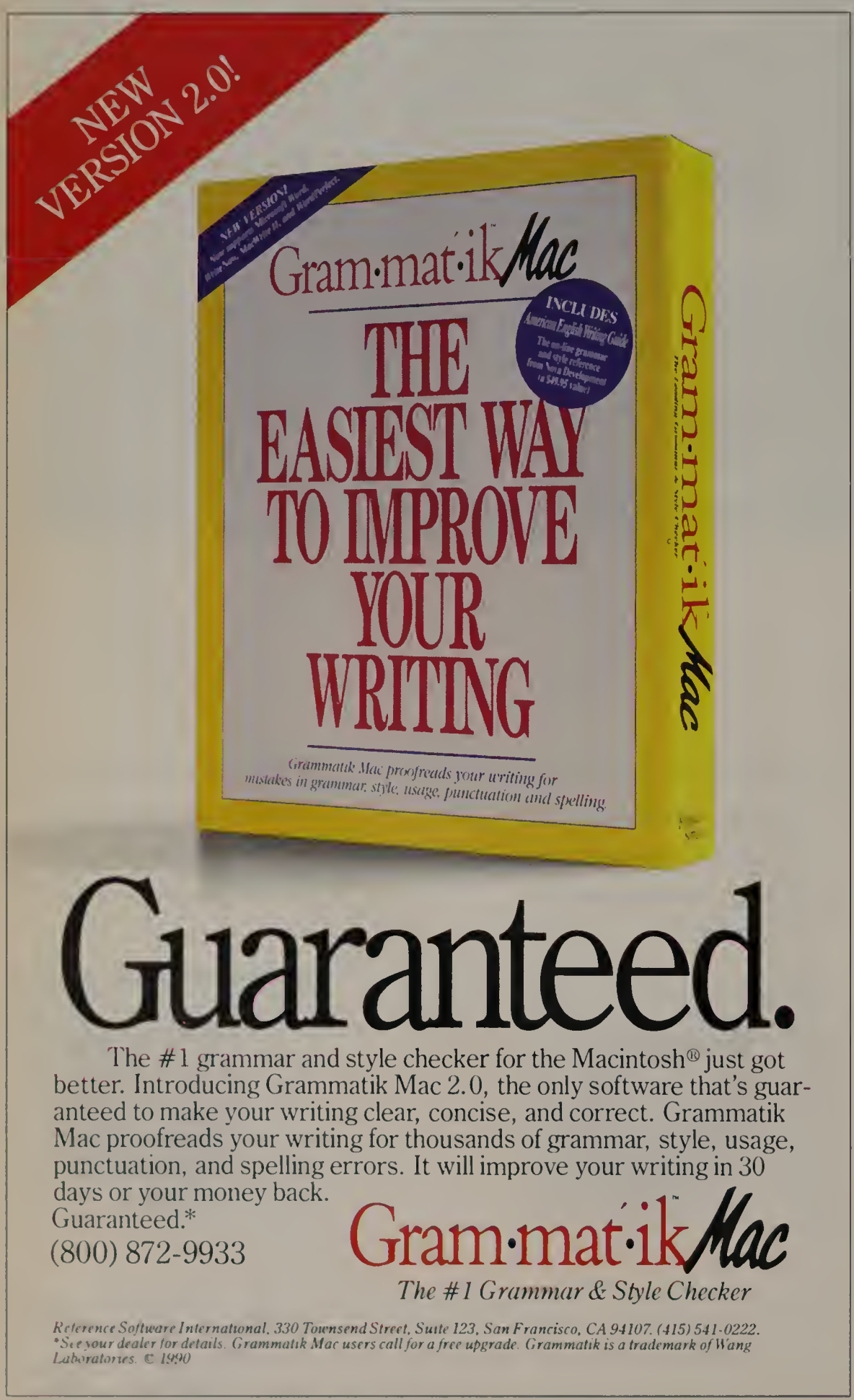
Baker and Cheung worked on the computer in off-hours during the early months of 1988. Eventually, of course, the project needed approval from above, so that the custom chips could be designed and manufactured. It was at one of these reviews that the machine—then called Spin—spun off course. The superiors decided to scrap Baker's idea to use a low-cost monitor; they dictated instead that the computer use the same video scheme being implemented in the high-end Macintosh IIci, then being readied for market. This would mean that Spin would require the powerful—and costly—68030 microprocessor.

At that time, Baker temporarily left the project to work on yet another high-end Mac, the IIx. He returned, in October 1988, in time to ready prototypes of Spin. The computer looked like an Apple IIGS with the power, and the same slick high-resolution color, of a full-size Mac II. Twenty were produced. Baker and Cheung distributed them throughout the company "to anyone who would take it," says Paul Baker. Yet the project was canceled. The low-cost color Mac, which by that time was not so terribly low-cost, seemed a fatality.

### Spin Control

If that was the darkest hour for the project, dawn was quick in arriving. The fortunes of the mother company were flagging, and the myriad critics of Apple Computer were quick to identify the cause—its computers cost too much. Almost coincidentally with the squashing of Spin, John Sculley was promising a crowd of hostile stock analysts that Apple would one day dazzle its customers with a budget alternative to its current offerings. What he didn't say was that Apple had just snuffed its most viable low-cost Macintosh development effort. Fortunately, the project could be revived—but now that everyone would judge the computer by its price tag, the cost would have to be brought down considerably. The Spin team was summoned to the office of then–Apple VP

*(continues)*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# WE'VE DECIDED TO HAVE A BIG CELEBRATION AND SEND YOU THE BILL.

Circle 318 on reader service card

Jean-Louis Gassée to discuss what adjustments would be made to make Spin a truly low-cost computer.

Speaking first at the meeting was Bill Goins, a former Dynamac engineering manager who had joined Apple some months before to manage the Spin project. Armed with some props—cheap color MS-DOS clones like the Tandy—he outlined various design alternatives. Since you couldn't have all the features of previous Macs at a fraction of the price, he argued, some beloved features of the Mac II would have to go.

Jean-Louis Gassée had his own point to make. Leaving his seat and literally getting down on his knees, he implored the engineers: Please! Make it color! So the low-cost Mac would be color. Befitting the project's new high priority within Apple, the team was beefed up considerably. There was soon a squad of engineers and designers who would lay out the circuit board, program the new ROMs, design the case, and perform the dozens of other jobs required in the creation of a new machine. But, as Bill Goins later recalled, "First we had to have The Plan." A controlling vision that would dictate what to put in and what to leave out.

In early 1989, The Plan was to cut costs to the bone. As a result, the prospective computer (now code-named Elsie) began to shape up as a kind of low-rent color Mac, with the penny-ante Apple IIc as its role model. It's almost shocking to contemplate now, but the prototype they produced that spring resembled a small one-piece box like the Apple IIc with a built-in keyboard. It had a single 800K floppy drive that could be used without a hard drive, since much of the Mac system software would be embedded in the ROMs. The power supply was lodged on the wall plug. It included a single megabyte of RAM. The machine would be able to output only 4-bit color, a crude alternative to the Macintosh 8-bit standard. Powering the computer was a simple 68000 chip, the same one found in the Mac Plus.

This version could indeed be produced cheaply. The problem was that it wasn't a very good computer. The processor was overmatched—it took aeons to draw the color. Obviously, a more powerful processor was required, as well as more storage. It was a tough decision, because the more powerful the processor, the more expensive the computer would become. Ultimately a solution evolved: there would be more than one low-cost Mac. Around April, a team was spun off to work on the original Spin design, to create what would become the Macintosh IIsi. And a few months later another team would break off to produce the black-and-white Macintosh Classic, using the 68000 processor. (Some of Paul Baker's XO work found its way into this computer.) The LC itself would navigate a middle course, using the Motorola 68020 chip. All the computers would use a hard drive. *(continues)*

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Circle 82 on reader service card.

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**Circle 35 on reader service card**

"The Plan was to do it without a hard drive. But it really isn't a Mac without a hard drive," admits Baker.

Since low-cost manufacturing and components were essential, Baker and the other engineers practiced a frugal, almost miserly form of design. At one point, there was a furious controversy over whether a plug should terminate in a male or female connector, the distaff alternative being chosen to save a few cents. Perfectly good components used in previous Macs required a redesign so they could be produced at a slightly lower cost. Making a new keyboard from scratch saved $2.50 a unit. And do you wonder why there's no way to hook an external floppy disk drive to the LC? Hey, a connector would have cost $1.50 per unit.

While such vigilance could slice a few dollars off the production cost, the real savings came from redesigning the system from the ground up. "We learned something very important about cost reduction," says Cheung. "You can't do it by eliminating features."

In fact, the team was eager to introduce entirely new features into the Macintosh family. The strategy in these cases was to build the feature, get it to work, and only then seek approval. "The key to getting something accepted is to make it a fait accompli," explains Paul Baker. A prime example is the voice input capability now included in all the new Macs. When engineer Eric Harslem suggested it, everyone agreed it was a neat idea. A custom sound chip was designed, and the LC team implemented a scheme whereby the user can simply pick up the mike (included with each computer) and verbally annotate documents. "When [the executives] heard it, they were convinced," says Baker.

### Lowering the Boom

As the project stretched on, the Elsie team began feeling the pressure. After all, consensus had it that the fate of Apple depended on the success of these low-cost Macs. People who wandered into project manager Bill Goins's office would be startled, even unhinged, to see a chart indicating that these new computers were destined to replace the Mac SE, the Mac Plus,

*(continues)*

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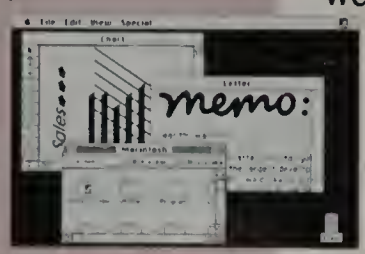


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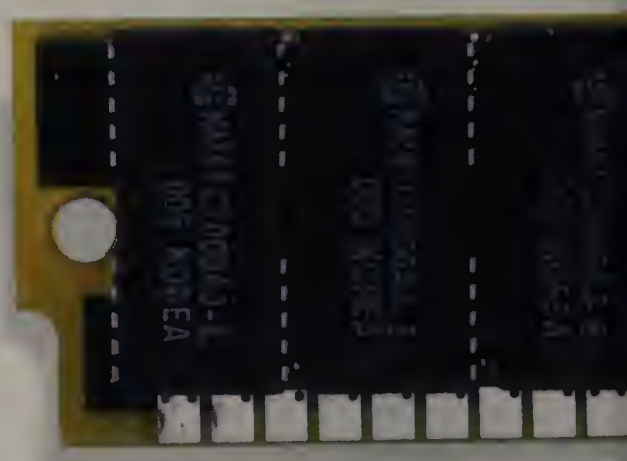

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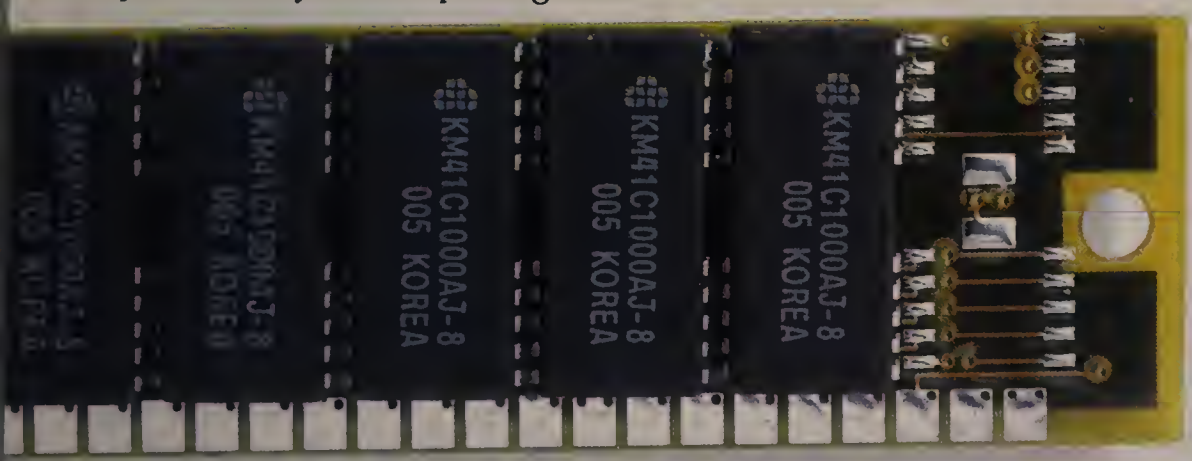


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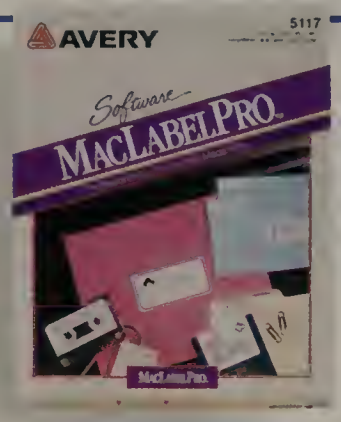


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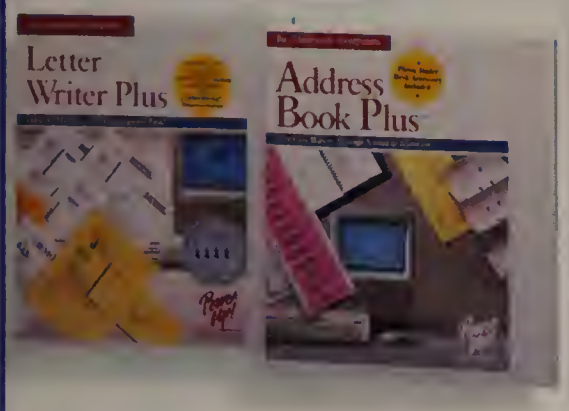
6468 DataDesk 3.0 . . . . . 459.

# stumped late at night.




PowerUp ... 30 day MBG

*7694 Address Book Plus 2.0*–Most complete way to manage & print your names & numbers . . $52.

*7697 Letter Writer Plus 1.1*–Powerful, easy-to-use, letter-writing and mail-merge tools. . . . . 52.

*8028 Address Book Plus/Letter Writer Plus bundle* . 87.

**Paragon Concepts**

5683 Nisus 3.01 . . . . . 245.

★**Peachtree ... 30 day MBG**

5207 atOnce! 1.1 *(formerly Layered)* . . . 285.

★**Portfolio Systems ... 30 day MBG**

7992 DynoPage 1.0 . . . . . 57.

6916 Dynodex 2.0 . . . . . 57.

7448 Dynodex Paper *(100 sheets, 300 pgs.)* 14.

★**PowerUp ... 30 day MBG**

7696 Calendar Creator . . . . . 35.

7697 Letter Writer Plus . . . . . 52.

7694 Address Book Plus . . . . . 52.

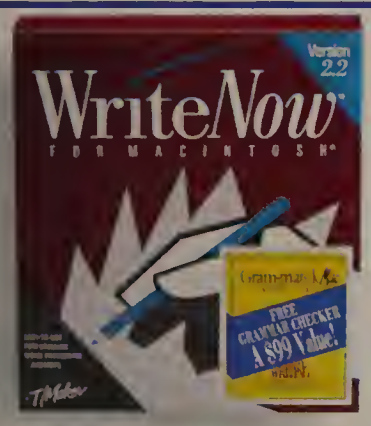
8028 Address Book/Letter Writer Bundle . 87.

7698 Fast Forms 2.0 . . . . . 105.

★**Preferred Publishers ... 30 day MBG**

4781 Vantage 1.5 . . . . . 52.

7650 Direct Mail 1.0.2 . . . . . 52.

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*7923 WriteNow 2.2*–The best value in word processing just got even better. T/Maker's Eddy Award winning word processor now includes Grammatik Mac 2.0, the top grammar/style checker (a $99 value FREE!) . . . . . $117.

4780 DAtabase 1.5 . . . . . $68.

★**ProVUE ... 60 day MBG**

4582 Panorama 1.5. . . . . 245.

★**Reality Technolgoies ... 30 day MBG**

6929 WeathBuilder 1.0 . . . . . 145.

★**Reference Software ... 30 day MBG**

6268 Grammatik Mac 2.0 . . . . . 50.

**Satori Software**

3320 BulkMailer 3.25 . . . . . 75.

★**Sensible Software ... 30 day MBG**

Sensible Grammar or Bookends ea. 51.

★**Shana ... 30 day MBG**

7693 Informed Mini-Manager v. 1.1 . . . . . 54.

7692 Informed Designer v. 1.0.4 . . . . . 159.

★**Softstream Int'l., Inc. ... 30 day MBG**

5439 Endeavour Planner 1.0. . . . . 89.

★**Softsync ... 30 day MBG**

7129 Accountant, Inc. Professional 1.0 . 345.

★**Spinnaker ... 30 day MBG**

6508 The Resume Kit . . . . . 35.

★**Survivor Software ... 30 day MBG**

6097 Invoiclt 1.01 *(reqs. MacMoney)* . . . . 49.

3289 MacMoney 3.5 . . . . . 59.

★**Symantec ... 30 day MBG**

3422 More 3.0. . . . . 265.

★**Symmetry ... 30 day MBG**

4504 Acta Advantage 1.02 . . . . . 63.

6069 KeyPlan 1.0 . . . . . 243.

★**Synergy ... 30 day MBG**

6617 KaleidaGraph 2.1 . . . . . 145.

★**Systat, Inc. ... 30 day MBG**

7410 Systat 5.0 . . . . . 599.

★**Teleware ... 30 day MBG**

7616 M.Y.O.B. 2.0 . . . . . 145.

★**TIMESLIPS ... 30 day MBG**

2986 Timeslips III 2.0. . . . . 195.

★**T/Maker ... 30 day MBG**

7923 WriteNow 2.2/Grammatik Mac. . . . 117.

★**Wayzata Tech. ... 60 day MBG**

7964 North American Facsimile Book . . 269.

★**WordPerfect ... 60 day MBG**

3800 WordPerfect Mac 1.0.3 . . . . . 229.

★**Zedcor ... 60 day MBG**

6742 Desk 1.0. . . . . 229.

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★**Aapps ... 30 day MBG**

7117 DigiVideo 1.0 *(black & white)* . . . . 398.

7114 DigiVideo Color . . . . . 639.

★**Abbott Systems ... 30 day MBG**

8052 Cheshire 1.0. . . . . 63.

**Adobe Systems**

Adobe Type Library . . . . . call

6957 Adobe Type Reunion 1.0. . . . . 38.

5750 Adobe Type Manager 2.0 . . . . . 55.

6053 Adobe Plus Pack. . . . . 109.

6156 Adobe Plus Pack/ATM. . . . . 159.

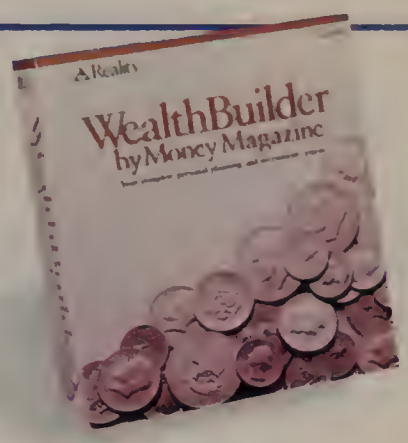
6098 TypeAlign for ATM 1.0.4 . . . . . 59.

6985 Adobe ATM/TypeAlign Pack . . . . . 89.

Adobe Type Set 1, 2 or 3. . . . . call

8042 Adobe Type Sets 1-2-3 Bundle . . . 199.

1137 Adobe Illustrator 3.0 . . . . . 349.




Reality Technologies ... 30 day MBG

*6929 WealthBuilder 1.0*–Earn more, invest wisely & save effectively with WealthBuilder, your complete personal planning & investment system. Objective information on up to 1,200 mutual funds & 10,000 stocks & bonds . $145.

6644 Adobe Photoshop 1.0. . . . . 499.

5605 TrueForm 2.1 . . . . . 225.

5001 StreamLine 1.2. . . . . 225.

Smart Art I, II, III, or IV . . . . . ea. 88.

★**Aldus/Silicon Beach ... 30 day MBG**

3506 SuperPaint 2.0 . . . . . 125.

3980 Digital Darkroom 1.1. . . . . 248.

3507 Super3D 2.1 . . . . . 315.

4751 Persuasion 2.0 . . . . . 329.

1330 FreeHand 2.02. . . . . 329.

7467 PrePrint 1.0 . . . . . 329.

7088 PageMaker 4.0. . . . . 499.

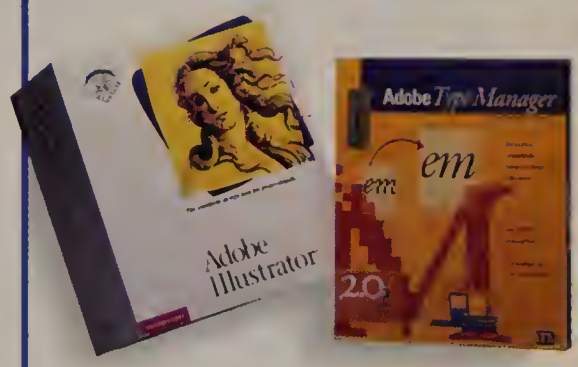
8054 Design Team *(PM, FH & PrePrint)* . 889.

**Altsys**

5425 Art Importer 2.0 . . . . . 75.

6499 Metamorphosis 1.5. . . . . 75.

1195 Fontographer 3.1 . . . . . 249.




Adobe Systems

1137 *Illustrator 3.0*–Direct, on-screen entering & manipulation of text. Control every aspect of the characters, including kerning, text on a corner & more. Currently bundled with ATM 2.0 . $349.

5750 *Adobe Type Manager 2.0* . . . . . 55.

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Aldus ... 30 day MBG
8054 *Design Team*–A bundle of the award winning PageMaker 4.0, the award winning FreeHand 2.0, and PrePrint 1.0. Offering you Desktop Publishing, Drawing and Color Separation all in one bundle..... $889.

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7784 MacCheese 1.05 ..... 57.
**Bright Star Technology**
6093 interFACE 1.0 ..... 249.
**Broderbund Software**
1427 The Print Shop 1.3.1 ..... 35.
6281 TypeStyler 1.5 ..... 115.
**★CE Software ... 60 day MBG**
7481 Amazing Paint 1.0 ..... 65.
**Claris**
1123 MacPaint II 2.0 ..... 92.
1117 MacDraw II 1.1 *(w/ATM)* ..... 289.
8007 Claris CAD 2.0 ..... 649.
**Computer Associates/Cricket**
1668 CA-Cricket Graph 1.3.2..... 125.
**★Creative Software ... 30 day MBG**
6645 Easy Color Paint 1.1 ..... 45.
**★Custom Applications ... 30 day MBG**
8037 Freedom of Press Light *(17 fonts)* .. 56.
6517 Freedom of Press 3.0 ..... 255.
**★DeltaPoint ... 60 day MBG**
6095 DeltaGraph 1.5..... 109.
**★Deneba Software ... 30 day MBG**
6365 UltraPaint 1.0 ..... 125.
1769 Canvas 2.1 ..... 189.

Innovative Data Design
2417 *MacDraft 2.1*–Powerful precision drawing and design software for the Macintosh. Features include advanced text handling, on-line symbol libraries, layers, Bezier and spline curves, dimensioning and more..... $279.

**★Dream Maker ... 30 day MBG**
MacGallery *(Paint or HyperCard)* ea. $27.
Cliptures: Business 1 or 2..... ea. 69.
7684 Cliptures: Sports 3 ..... 69.
**Dubl-Click Software**
WetPaint Clip-Art ..... ea. 42.
**★Electronic Arts ... 30 day MBG**
7736 Studio/8 & Studio/1 Bundle..... 295.
8056 Studio/32 ..... 449.
**★Faralion Computing ... 30 day MBG**
6770 MacRecorder Voice Digitizer..... 89.
2199 MacRecorder 2.01 ..... 159.
**★Foundation Publishing ... 60 day MBG**
Comic People or Kid Stuff .... ea. 21.
6728 Comic Strip Factory 1.6 ..... 37.
**★Generic Software ... 60 day MBG**
4319 Generic CADD Level 1 1.1..... 93.
7454 Generic CADD 1.0 ..... 375.
**Innovative Data Design**
2417 MacDraft 2.1..... 279.
4707 Dreams 1.1..... 319.

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7441 *Swivel 3D Professional 1.0*–The best selling 24-bit 3D program available..... $439.
7839 *FilmMaker 1.0*–Features full animation, anti-aliasing and transparency for multimedia presentations ..... 439.

**Letraset**
2619 ImageStudio 1.5 ..... 139.
2621 Ready Set Go! 4.5A ..... 165.
4709 LetraStudio 1.5..... 275.
6300 FontStudio 1.0 ..... 359.
6302 DesignStudio 1.0 ..... 489.
6301 ColorStudio 1.0 ..... 649.
**★Linguist's Software ... 60 day MBG**
*Over 100 language fonts*..... call
MacKanji 6.0 or LaserVietnamese ea. 79.
**★MacroMind ... 30 day MBG**
7712 MacroMind CD-ROM ..... 125.
6159 MacroMind Accelerator..... 125.
5087 MacroMind Director 2.0 ..... 439.
**★Mainstay ... 30 day MBG**
7714 Capture 3.0 ..... 45.
**★MicroFrontier ... 30 day MBG**
7886 ENHANCE 1.0.3 ..... 239.
**★MicroMaps ... 30 day MBG**
7554 MapArt *(Paint)*..... 41.
MapArt *(EPS)* or MapArt *(PICT)*.... 99.
**★Microsoft ... 30 day MBG**
2878 PowerPoint 2.01 ..... 245.
**NEC**
Image Gallery, Photo Gallery, Type Gallery PS *(CD-ROM titles)*... ea. 246.
6625 Clip-Art 3D *(CD-ROM)*..... 246.

Electronic Arts ... 30 day MBG
8056 *Studio/32*–32-bit technology for unlimited creative expression. Pantone Matching System, Airbrush tool, 3D perspectives, PostScript printing, and more. Studio 32 works the way you want it to work..... $449.

**Olduvai**
7120 VideoPaint 1.0 ..... 279.
**PANTONE**
7466 Process Color Imaging Guide..... 49.
**Paracomp**
7421 DrawTools 1.0..... 62.
7728 SwivelArt 1.0..... 82.
4597 Swivel 3D 1.1 ..... 295.
7441 Swivel 3D Professional 1.0 ..... 439.
5028 Model Shop 1.1 ..... 375.
7839 FilmMaker 1.0..... 439.
**★Preferred Publishers ... 30 day MBG**
7828 Exposure Pro ..... 69.
8055 Screenshot ..... 31.
**Quark**
7612 Quark XPress 3.0 ..... 529.
**Somak Software ... 30 day MBG**
7993 LaserArt CD-ROM Vol. 2..... 62.
**Softview**
7499 if:X Forms Designer 1.0..... 169.
**★Solutions, Inc. ... 60 day MBG**
3446 The Curator 1.05..... 71.
**★Somak Software ... 30 day MBG**
7434 LaserArt CD-ROM Volume 1 ..... 62.
**★Springboard ... 30 day MBG**
3530 Certificate Maker 2.0..... 22.
4497 Top Honors 1.01 ..... 57.
4500 Springboard Publisher II 2.0 ..... 107.
**Strata**
7773 Stratavision 3D..... 369.
7772 Stratavision 3D/Renderman Bundle. 999.
**Strategic Mapping**
6518 ATLAS•MapMaker 4.5 ..... 369.
**★SuperMac Tech. ... 60 day MBG**
5625 PixelPaint Professional 2.0 ..... 465.
**3G Graphics**
3942 Images with Impact: Graphics 1 ... 50.
4583 Images: Business 1 or Accents.. ea. 65.
**★Timeworks ... 30 day MBG**
7115 Publish It! *Easy* 2.0 ..... 145.
5908 Publish It! 1.2 ..... 222.
**★T/Maker ... 30 day MBG**
3633 ClickArt Christian Images ..... 39.
7424 EPS Animals & Nature ..... 82.
**★Wayzata Tech. ... 60 day MBG**
7966 U.S. Government Seals *(CD-ROM)* . 49.
6576 Vietnam Remembered *(CD-ROM)*.. 69.
6370 Quick Art *(CD-ROM)* ..... 175.

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Custom Applications ... 30 day MBG
6517 *Freedom of Press 3.0*–Brings PostScript printing capabilities to non PostScript, black and white devices. New features include Adobe Type 1 support and supports all Macs..... $255.
8037 *Freedom of Press Light* (17 fonts)..... 56.

**★Wildflower ... 30 day MBG**
6512 SnapJot 2.0 ..... 32.
**★Zedcor ... 60 day MBG**
3986 DeskPaint & DeskDraw 3.0 ..... 115.

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**★Abbott Systems ... 30 day MBG**
5236 CanOpener 1.1 ..... 63.
**★Advanced Software ... 30 day MBG**
8051 In touch 1.0 ..... 40.
**★Affinity Microsystems ... 60 day MBG**
1016 Tempo II 1.2.4..... 93.
7835 Tempo II Plus ..... 105.
**★Aladdin Systems ... 30 day MBG**
6169 Shortcut 1.1 ..... 46.
7504 Programmer's Assistant 1.0 ..... 57.
6740 StuffIt Deluxe 1.5 ..... 63.
**★Aldus/Silicon Beach ... 30 day MBG**
5100 SuperCard 1.5 ..... 199.
**★ASD Software ... 30 day MBG**
7085 FileGuard Extended 2.5 *(1 user)* .. 145.
7422 FileGuard Office Pack 2.5 *(5 user)*. 349.
7423 FileGuard Office Pack 2.5 *(10 user)* 579.
**★Baseline Publishing ... 30 day MBG**
7783 INIT Manager..... 35.
**★Berkeley Systems ... 30 day MBG**
5737 After Dark 2.0..... 22.
1541 Stepping Out II 2.02 ..... 49.
**Borland**
1511 Turbo Pascal 1.1..... 68.
**★Bravo ... 30 day MBG**
5404 SPAMM 1.1 ..... 48.
**★Casady & Greene ... 60 day MBG**
2269 QuickDEX 1.4D ..... 34.
7443 A.M.E. 1.1 ..... 159.
**★CE Software ... 60 day MBG**
4689 MockPackage Plus Utilities 4.4 .... 31.
1727 CalendarMaker 3.0..... 31.
6278 DiskTop 4.0..... 63.

7518 Alarming Events 1.0 ..... $85.
8024 QuicKeys 2.0 ..... 94.
**★Central Point ... 30 day MBG**
5040 Copy II Mac 7.2 ..... 23.
5041 Mac Tools Deluxe 1.0 ..... 75.
**★Connectix ... 30 day MBG**
7830 Maxima ..... 89.
6123 Virtual 2.03 *(for SE/30, IIcx, IIx, & IIci)* 115.
6122 Virtual 2.03 *(for Mac II, incl. PMMU)* . 188.
**★Dantz Development ... 30 day MBG**
5255 Retrospect 1.2 ..... 148.
7945 Retrospect Remote..... 265.
7946 Remote *(10 Pack)* ..... 148.
**★Design Science ... 30 day MBG**
7887 MathType 2.0 ..... 89.
**★Digitalk ... 60 day MBG**
5166 SmallTalk/V Mac 1.1 ..... 124.
**Dubl-Click Software**
7974 ClickChange..... 41.
1824 Calculator Construction Set 2.05... 45.

Zedcor ... 60 day MBG
6742 *Desk 1.0*–Seven powerful DAs. Word processor, spreadsheet, database, communications, paint, draw & time management . $229.
3986 *DeskPaint & DeskDraw 3.0*–Get paint or draw separately ..... 115.

**★Fifth Generation ... 30 day MBG**
4287 PYRO! 4.0 *(screen saver)* ..... 25.
3955 Suitcase II 1.2.6 ..... 49.
7700 File Director 1.0 ..... 82.
FastBack II 2.5 or DiskLock 2.0 ... 118.
3383 SuperSpool 5.0 ..... 58.
3382 SuperLaserSpool 2.02 ..... 87.
3378 SuperLaserSpool 5-Pack 2.02 ... 289.
**★Foundation Publishing ... 60 day MBG**
6701 HyperSpeller 1.0 ..... 29.
**Hyperpress Publishing**
4233 Icon Factory 1.0 ..... 45.
**ICOM Simulations**
4084 On Cue 1.3..... 35.
5681 HyperTMON 1.0..... 57.
4085 TMON 2.8.4 ..... 86.
**Individual Software**
4719 101 Scripts & Buttons HyperCard 1.2 35.
**★Insight Development ... 30 day MBG**
6171 MacPrint 1.22..... 94.

ASD Software ... 30 day MBG
7085 *FileGuard Extended 2.5*–Protect your hard drives, applications, files/folders (including system folder) from unauthorized access, deletion, and/or illegal copying. Now with system usage audit trail. 5 & 10 user also available.... $145.

**★JAM Software ... 30 day MBG**
6089 Smart Alarms w/Appt. Diary 3.0.1.. 63.
6088 Smart Alarms 3.0 *(1-4 users)*..... 125.
6087 Smart Alarms 3.0 *(5-8 users)*..... 187.
**★Kent Marsh Ltd. ... 30 day MBG**
5457 QuickLock 2.0 ..... 34.
2591 The NightWatch 1.03 ..... 85.
6134 MacSafe II..... 107.
**★Kiwi Software ... 60 day MBG**
6267 KiwiEnvelopes! 3.0..... 33.
7445 KiwiFinder Extender 1.0..... 65.
**★Loop Software ... 30 day MBG**
5442 PictureBook 3.2 ..... 39.
**★Magic Software ... 30 day MBG**
7267 AutoSave II 1.1 ..... 28.
7268 POWERicons 1.0 ..... 39.
7270 Backmatic 1.1 ..... 50.

Portfolio Systems ... 30 day MBG
6916 *Dynodex 2.0*–For Filofax, Day-Timer, or any personal organizer, manages & prints addresses. Labels & rolodex cards tool includes free DA. $57.
7992 *DynoPage 1.0*–Prints any Macintosh file to personal-organizer pages. Just insert and go! . 57.

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7722 Marco Polo 1.0.1 ..... $152.
★**Microcom ... 30 day MBG**
4803 Virex 2.8 ..... 56.
5885 Virex *(10 Pack)* ..... 329.
7459 CarbonCopy Mac *(Single, 2 req.)* . 117.
7465 CarbonCopy Mac *(Twin Pack)* .... 152.
★**Microlytics ... 60 day MBG**
2732 GOfer 2.0 ..... 45.
★**Microseeds Pub. ... 60 day MBG**
7068 INITPicker 2.0 ..... 35.
2913 Redux 1.62 ..... 49.
7116 Rival 1.1 ..... 49.
★**Microsoft ... 30 day MBG**
4471 QuickBasic 1.0 ..... 64.
★**Millenium Software ... 30 day MBG**
6105 HyperX 4.0 ..... 99.
★**Now Software ... 30 day MBG**
6924 ScreenLocker 1.0 ..... *special* 45.
6925 Now Utilities 2.0 ..... 82.
6739 Prototyper 3.0 ..... 184.
**Olduvai**
4503 MultiClip 2.0 ..... 72.
★**ON Technology ... 1 year MBG**
6385 On Location 1.0 ..... 75.

Advanced Software ... 30 day MBG
8051 *In touch 1.0*—DA that organizes your contracts & provides many convenient ways to stay in touch. It's the only DA that stores names, addresses, & notes, prints envelopes & labels, dials phone numbers & more. . . . . $40.

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6656 Personality 1.1 ..... 49.
★**Salient Software ... 30 day MBG**
7404 DiskDoubler 3.0 ..... 45.
7403 Partner 1.01 ..... 56.
★**Softstream Int'l., Inc. ... 30 day MBG**
7589 Relational Objex 1.0 ..... 149.
5440 HyperHIT 2.2 ..... *special* 119.
7450 HyperHIT Relational ..... 269.
★**Software Innovations ... 30 day MBG**
6647 HandOff II ..... 52.
★**Solutions, Inc. ... 60 day MBG**
3448 SmartScrap & The Clipper 2.1 .... 45.
3449 SuperGlue II 2.01 ..... 61.
★**Somak Software ... 30 day MBG**
ScriptEdit 2.0 or SharpenUp 1.0 ea. 62.
★**Spinnaker ... 30 day MBG**
6692 PLUS 2.0 ..... 115.
★**SuperMac Tech. ... 60 day MBG**
3377 DiskFit 1.5.1 ..... 58.
3379 Network DiskFit 1.5 ..... 225.
★**Symantec ... 30 day MBG**
4644 Just Enough Pascal 1.0 ..... 52.

JAM Software ... 30 day MBG
6089 *Smart Alarms with Appointment Diary 3.0*—A Macintosh reminder and calendar system featuring: auto backup, variable snooze, multiple reminders, weekly and monthly views, and zoom. Multiple users available $63.

5176 Symantec AntiVirus for Mac *(SAM)* . 67.
5724 Symantec Utilities for Mac *(SUM II)* . 99.
3421 THINK Pascal 3.0 ..... 165.
3420 THINK C 4.0 ..... 165.
6748 Norton Utilities for the Mac 1.0 .... 84.
★**Synex ... 30 day MBG**
7147 MacEnvelope 5.0 ..... 57.
6666 MacEnvelope Plus 2.0 ..... 159.
★**Systems Compatibility ... 30 day MBG**
7872 Software Bridge 1.0 ..... 75.
★**Teletypesetting ... 30 day MBG**
8058 TScript ..... 92.
★**TGS Systems ... 30 day MBG**
6667 Prograph 2.0 Compiler Version . . . 245.
**True BASIC, Inc.**
3587 True BASIC 2.02 ..... 55.
★**Wayzata Tech. ... 60 day MBG**
7679 Disc Tracy Prog. Detective *(CD-ROM)* 75.
7965 Best of MacTutor *(CD-ROM)* ..... 99.
★**Williams & Macias ... 30 day MBG**
6926 myDiskLabeler III 3.0 ..... 42.
4976 StickyBusiness 1.3 ..... 51.
6927 StickyBusiness Plus 1.3 *(bar codes)* 91.
★**Zedcor ... 60 day MBG**
3985 ZBasic 5.0 ..... 99.

Teleware ... 30 day MBG
7616 *M.Y.O.B. 2.0*—Incredible accounting software. "Best business deal on the Mac"—MacUser Eddy Awards. A/R, A/P, G/L, Check-book, Inventory, and Card File. Easy to setup and use, full integration, custom forms. . $145.

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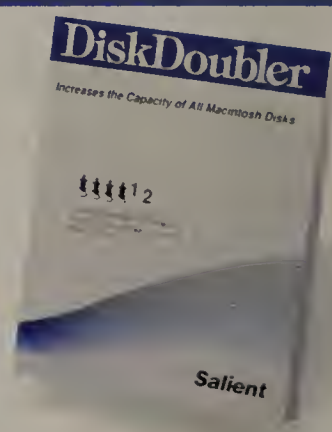
**Activision**
4486 Manhole ..... $28.
5127 Manhole *(CD-ROM)* ..... 34.
5517 Cosmic Osmo ..... 40.
★**Aldus/Silicon Beach ... 30 day MBG**
3502 Beyond Dark Castle ..... 32.
3503 Dark Castle 1.1 ..... 32.
★**Ars Nova ... 30 day MBG**
1215 Practica Musica 2.2 ..... 69.
★**Baseline Publishing ... 30 day MBG**
7785 Talking Moose ..... 23.
★**Beacon Technology ... 30 day MBG**
Gems of The Word 1.0 *(KJ or NI)* ea. 25.
4967 HyperBible 1.0 *(King James)* .... 145.
4968 HyperBible 1.0 *(New International)* 175.
★**Bogas Productions ... 60 day MBG**
6135 Super Studio Session w/Music Library 99.
**Bright Star Technology**
1402 Alphabet Blocks 1.0 ..... 30.
**Broderbund Software**
4314 Type! 1.0 ..... 18.
4540 Ancient Art of War at Sea *(CP)* ..... 26.




Salient ... 30 day MBG
7404 *DiskDoubler 3.0*—Expand your disk drive capacity. Fast, easy and safe, DiskDoubler dramatically increases the storage capacity of any Mac drive. "Performance is outstanding," evaluates *MacUser*, 7/90 (4½ Mice rating). $45.

6516 The Playroom *(CP)* ..... 29.
4229 Carmen Sandiego Series *(CP)* . . .ea. 29.
4966 SimCity 1.2 *(CP)* ..... 29.
5871 SimCity Supreme 1.2C ..... 47.
Geometry 1.2 *(CP)*, Physics 1.2 *(CP)*, Calculus 1.2 *(CP)* ..... ea. 58.
5237 Whole Earth Catalog *(CD-ROM)* . . . 89.
**Bull City ... 30 day MBG**
5841 Moriarity Revenge *(CP)* ..... 32.
**Bullseye**
Ferrari *(CP)* or P51 Mustang *(CP)* ea. 31.
**Carina Software**
5726 Voyager 1.2 ..... 88.
★**Casady & Greene ... 60 day MBG**
2268 Crystal Quest 2.2X ..... 29.
Mission Starlight or Sky Shadow ea. 29.
7498 Sky Shadow ..... 29.
**Coda Music Systems**
5854 MusicProse 1.01 ..... 186.
5604 Finale 2.0 ..... 549.
**Davidson & Associates**
1734 Math Blaster! 1.0 *(CP)* ..... 29.
6128 Math Blaster Mystery *(CP)* ..... 29.

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6663 Sands of Fire . . . . . 32.
6594 Starflight . . . . . 39.
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5293 Dinosaur Discovery Kit 1.0 *(ages 3-8)* 27.
**★Great Wave ... 30 day MBG**
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2271 ConcertWare + MIDI 5.1 . . . . . 98.
NumberMaze Decimals & Fractions *(specify B&W or Color)* . . . . . ea. 36.
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Bull City Software ... 30 day MBG
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5453 Talking Math Rabbit 1.0 *(ages 4-7)* . 30.
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**Miles Computing**
5253 The Puzzle Gallery . . . . . 26.
2765 Fool's Errand . . . . . 32.
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4596 Deja Vu II *(CP)* . . . . . 29.
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**Premier Technology**
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5774 NetTrek—The Real Version 2.3 . . . . 34.
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**Sierra On-Line**
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Manhunter: San Fran. or NY *(CP)* ea. 28.
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**★Software Toolworks ... 30 day MBG**
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4619 Mavis Beacon Typing 1.3 *(CP)* . . . . 32.
4588 Life & Death *(CP)* . . . . . 32.
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**★Spinnaker ... 30 day MBG**
2328 Sargon IV *(CP)* . . . . . 28.
**★Toyogo ... 30 day MBG**
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7623 Nemesis Go Master Deluxe 4.7. . . . 88.

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## NETWORKS & COMMUNICATIONS

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1676 CompuServe Information Service . . 23.

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230C

MMC

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4842 MacLink Plus/Translators 4.5 . . . . . 98.

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4866 Timbuktu/Remote 2.0 . . . . . 123.
6371 Timbuktu/Remote Access Pack . . 845.
5664 PhoneNET StarConnector . . . . . 17.
6273 PhoneNET StarConnector 10-Pack . 129.
2203 PhoneNET Connector *(DIN-8)* . . . . . 31.
4869 PhoneNET Connector 10-Pk *(DIN-8)* 198.
2206 PhoneNET StarController 300 . . . . . 825.
6687 PhoneNET StarController-EN . . . . 1599.
6766 MediaTracks . . . . . 189.
6767 MediaTracks Multimedia CD Pack . 319.
6768 MediaTracks Multimedia Pack . . . . 319.

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2300 Smartcom II 3.1C . . . . . 84.
2307 Smartmodem 2400 . . . . . 349.
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5991 V9600 Baud Modem . . . . . 719.

**Information Presentation Tech.**
8060 Personal Server Network *(PSN)* . . . 108.

**Insignia Solutions**
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7058 SoftPC-AT/EGA Module . . . . . 125.
4089 SoftPC 1.3 . . . . . 245.

**Intel Corporation**
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6265 2400EX with QuickLink II . . . . . 195.
6420 2400EX MNP Modem . . . . . 229.
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5856 Microsoft Mail 2.0 Server . . . . . 245.

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6751 TurboNet ST *(12-Pack)* . . . . . 279.
5277 TurboBridge . . . . . 319.
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6272 NuvoLink SC . . . . . 309.

**Orchid Technology**
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4942 TeleBridge . . . . . 339.
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**★Solutions, inc. ... 60 day MBG**
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**★Synergy ... 30 day MBG**
6618 VersaTerm 4.1.1 . . . . . 88.
6619 VersaTerm-PRO 3.1.1 . . . . . 174.

**★Traveling Software ... 60 day MBG**
3729 LapLink Mac III Connectivity Pac . . 119.

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**★Abaton ... 30 day MBG**
7432 Scan 300/GS . . . . . 999.
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7431 Scanner Kit w/ImageStudio . . . . . 259.

Software Ventures ... 30 day MBG
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6661 OmniProof . . . . . 105.

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7344 Rollermouse *(ADB)* . . . . . 79.

**★CoStar ... 30 day MBG**
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6067 LabelWriter Labels . . . . . 11.

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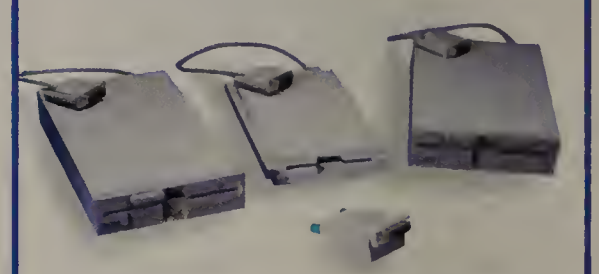
7687 Mac Daisy Link . . . . . 59.
6256 PrintLink Collection 3.01 . . . . . 59.
6151 JetLink Express 2.0 . . . . . 89.

**Hewlett-Packard**
6514 HP DeskWriter Printer . . . . . 759.

**★Kensington ... 30 day MBG**
Turbo Mouse 3.0 *(Plus or ADB)* ea. 109.



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Paul Vendrick

Paul Vendrick
St. Louis, MO

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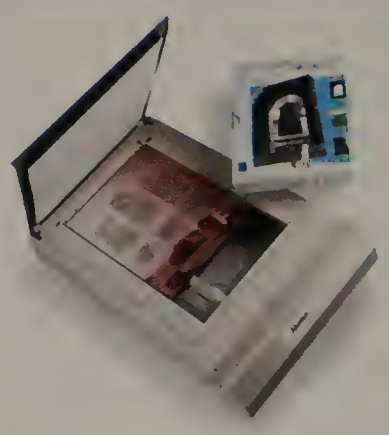

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3991 45+ Meg Hard Drive . . . . . 435.
5275 60+ Meg Hard Drive . . . . . 469.
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5456 45 Meg Removable Drive . . . . . 669.
5736 45 Meg Removable Cartridge. . . . . 89.
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MaraThon 030 for Plus, SE or II ea. 529.
1809 MacSnap 524S. . . . . 265.
1812 MacSnap 548S. . . . . 529.
**★Micron ... 30 day MBG**
7149 Xceed IIci-128 Cache Card . . . . . 269.
**NEC**
6744 CDR35 CD-ROM Portable Drive . . 399.
6743 Mac Driver Kit. . . . . 64.
**★Pacific Rim ... 30 day MBG**
7382 Platinum 800k Drive . . . . . 145.
**Quantum**
Quantum 40 Meg Internals for SE, SE/30, IIx, IIfx, ci & cx. . . . . ea. 375.
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7457 RasterOps 8L ColorBoard. . . . . 1495.
7468 ClearVue/GE System for Mac II . . 1759.
**SAFE Power Systems**
4561 250 Watt . . . . . 199.
**★Sophisticated Circuits ... 30 day MBG**
8009 PowerKey . . . . . 65.
8008 PowerKey Wake Up Cable . . . . . 32.
**TheComplete PC**
6104 Half-Page Scanner/400 . . . . . 295.
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**Thunderware**
3648 ThunderScan Plus ThunderWorks. 199.
4994 LightningScan 400 . . . . . 385.
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**SIMMs ... 2 year warranty**
*Includes a free SIMMs Installation video tape, please specify VHS or 8mm*
1107 1 Meg SIMMs *(80ns)*. . . . . 57.
7497 1 Meg SIMMs for Mac IIfx *(80ns)*. . . call
**CD Technology**
6983 CD-ROM Porta Drive . . . . . 649.

Total Systems
*Gemini Accelerator*–A cost effective and quick solution for slow processing times. Installs easily in an SE. With the optional Plus Kit, it can also be installed in 128s, 512s, 512Es, and Pluses . . . . . **call**

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6621 MacTRAC ADB . . . . . 75.
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7560 Trackball ADB. . . . . 69.
7520 Little Mouse . . . . . 75.
8001 Little Mouse Plus . . . . . 75.
**★Nutmeg Systems ... 30 day MBG**
7920 SE/30 Color Video Interface . . . . . 339.
6240 SE/30 Monochrome Video Interface 499.
15" Monitor for SE, SE/30 or II. ea. 599.
19" Monitor for SE, SE/30 or II. ea. 995.
**★Orange Micro ... 30 day MBG**
3036 Grappler *(9 pin)* . . . . . 87.
6229 Grappler LX . . . . . 128.
**Pacific Data Products**
7411 Pacific MacPage. . . . . 425.
7412 Pacific MacPage PE . . . . . 459.
**RasterOps**
7464 ColorBoard 208 . . . . . 379.
7463 ColorBoard 264 for Mac II. . . . . 579.
7469 ColorBoard 264 for SE/30. . . . . 689.
7457 Video ColorBoard 364 . . . . . 1495.

Cutting Edge ... 30 day MBG
*Cutting Edge Hard Drives* are fast and reliable with access times as low as 23 milliseconds and a mean time between failure rating of up to 100,000 hours. An outstanding combination of quality and low price. . . . . **see line listing.**

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5449 Dataframe XP 100 Hard Drive . . . 1049.
7451 Dataframe XP 200 Hard Drive. . . 1399.
5451 Dataframe XP 330 Hard Drive. . . 2369.
**Toshiba**
6749 XM 3201 CD-ROM Drive. . . . . 899.

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**Apple Computer**
6717 MIDI Interface. . . . . 84.
7748 Personal LaserWriter Toner Cart. . . 89.
1114 LaserWriter Plus Toner Cartridge. . . 99.
1115 LaserWriter II Toner Cartridge . . . . 105.
**★Avery ... 60 day MBG**
4812 Laser Labels 4¾" x ½" *(Qty. 2000)* . . . 7.
4808 Laser Labels 4" x 1⅓" *(Qty. 1400)* . . . 24.
4807 Laser Labels 1" x 2⅝" *(Qty. 3000)* . . . 24.
4864 Disk Labels 3½" *(Qty. 250)* . . . . . 13.
5392 Disk Labels 3½"-*Laser (Qty. 630)* . . 29.
5403 Address Labels 1 7/16" x 4" *(1000)* . . . . 9.
4865 Address Labels 3½" x 15/16" *(3750)* . 15.
4811 Transparencies 8½" x 11" *(Qty. 50)* . . 22.

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Dove Computer ... 60 day MBG
*MaraThon 030 w/Virtual 2.0, SUM II, SAM 2.0*–Turn a Plus, SE or II into a powerful workstation. Create 16 MB of app memory with the Dove 030 upgrade w/Virtual, without adding RAM. Mac II version doubles CPU speed $529.

**★Basic Needs ... 60 day MBG**

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| | Dust Covers | call |
| | Hard Top Keyboards ea. | 15. |
| 6682 | Hard Top ImageWriter II | 16. |
| 7413 | Mac IIcx/ci Monitor Stand | 40. |
| 7417 | Cordless Mouse | 89. |

**★Computer Coverup ... 60 day MBG**

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|---|---|---|
| 1723 | ImageWriter II Cover | 8. |
| 1725 | Mac SE Ext. Keyboard Cover set | 10. |

**★CoStar ... 30 day MBG**

| | | |
|---|---|---|
| 7453 | The Organizer Jr. | 69. |
| 6091 | The Organizer | 199. |

**Curtis Manufacturing**

| | | |
|---|---|---|
| 6733 | GFP-3 *(Glass Filter Plus-Mac Plus, SE)* | 65. |
| 8045 | MVP Foot Switch | 19. |
| 8046 | MVP Mouse | 89. |

**★I/O Design ... 30 day MBG**

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| 2379 | MacLuggage Imageware II | 49. |
| 2381 | MacLuggage Macinware SE | 75. |
| 6129 | Ultimate SE/Ext. Carrying Case | 79. |
| | Ultimate SE/Ext. Neon Case *(available in green, pink or yellow)* ea. | 89. |

**★Kensington ... 30 day MBG**

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|---|---|---|
| 2573 | Tilt/Swivel *(platinum)* | 22. |
| 4973 | Power Tree 20 | 27. |

Sophisticated Circuits ... 30 day MBG
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|---|---|---|
| 2559 | Apple Security Kit | $33. |
| 2566 | System Saver Mac *(platinum)* | 63. |
| 2567 | System Saver Mac *(beige)* | 63. |
| 2546 | A-B Box *(DIN-8)* | 63. |
| 4643 | Mac II Stand and Cable Kit | 64. |
| 6763 | SE Radiation/Anti-Glare Filter | 52. |
| 5064 | Apple Color Monitor Polarizing Filter | 63. |

**★MacConnection ... 60 day MBG**

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|---|---|---|
| 4623 | Solid Oak Disk Case *(holds 90 disks)* | 32. |

**★Moblus Technologies ... 60 day MBG**

| | | |
|---|---|---|
| 4470 | Fanny Mac QT | 55. |

**★Moustrak ... 60 day MBG**
*Available in blue (listed) or gray.*

| | | |
|---|---|---|
| 2694 | Moustrak Pad *(standard 7" x 9")* | 8. |
| 2692 | Moustrak Pad *(large 9" x 11")* | 9. |
| 2693 | Moustrak Pad L/F *(large 9" x 11")* | 10. |

**Ribbons**

| | | |
|---|---|---|
| 3255 | ImageWriter II Ribbon Black | 4. |
| 3261 | ImageWriter II Ribbon Multi-4-Color | 9. |
| 3270 | ImageWriter II Rainbow 6-Pack | 20. |
| 3260 | ImageWriter LQ Black Ribbon | 17. |

Micron ... 30 day MBG
6680 *Xceed SE/30 Video Card*–640 x 480 resolution, 8-bit color video card for the SE/30. For 13" and 14" monitors. See line listing for more video card solutions ..... $349.

**★Sopris Softworks ... 60 day MBG**

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| 4019 | Mac SE & Ext. Keyboard Cover *(navy)* | 15. |
| 4017 | ImageWriter II Cover *(navy)* | 11. |
| 4018 | LaserWriter II Series Cover *(navy)* | 17. |
| 4012 | High Trek ImageWriter Carry Case | 49. |
| 4013 | High Trek Mac Plus Carry Case | 59. |
| 4014 | High Trek Mac SE & Ext. Kybd. Case | 69. |
| 4862 | SE Protection Pak *(ext. keyboard)* | 75. |

**★Targus ... 60 day MBG**

| | | |
|---|---|---|
| 3618 | ImageWriter II Carry Case | 45. |
| 3617 | Mac Plus/SE Carry Case | 55. |
| 4015 | Mac SE & Ext. Kybd. Carry Case | 69. |
| 6116 | Mac IIcx Carry Case | 75. |

**★Tripp Lite ... 30 day MBG**

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|---|---|---|
| 6199 | Isobar 4 *(surge suppressor, 4 outlets)* | 49. |
| 6200 | Isobar 6 *(surge suppressor, 6 outlets)* | 59. |

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**★Sony ... 60 day MBG**

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|---|---|---|
| 3297 | 3½" DS/DD Disks *(10)* | 13. |
| 6148 | 3½" DS/DD Disks 3 Pak *(30)* | 30. |
| 3298 | 3½" HD Disks 1.44 Meg *(10)* | 22. |
| 6375 | 3½" HD Disks 3 Pak *(30)* | 56. |
| 6659 | QD2000 40 MB Data Cartridge | 19. |

**★MacConnection ... 60 day MBG**

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|---|---|---|
| 6592 | 44 Meg Removable Cartridge | 85. |

MicroSpeed ... 30 day MBG
*MacTRAC*–The most ergonomical trackball available. Replace your mouse & work faster & more easily in 1/3 the desk space. Dragging is a breeze with the built-in drag lock button.
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**★MAXELL ... 60 day MBG**

| | | |
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| 2792 | 3½" DS/DD Disks *(10)* | 14. |
| 2793 | 3½" HD Disks 1.44 Meg *(10)* | 27. |

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|---|---|---|---|---|---|---|---|---|---|---|
| Puts | 12/28/84 | 100 | $3 00 | $209 25 | $30,209 25 | 01/09/85 | $4 25 | $226 25 | $42,273 75 | $12,064 50 |
| Calls | 01/29/85 | 100 | $4 38 | $230 00 | $43,980 00 | 02/11/85 | $5 63 | $267 50 | $55,982 50 | $12,002 50 |
| Puts | 03/12/85 | 100 | $2 88 | $209 25 | $28,959 25 | 03/19/85 | $4 00 | $218 75 | $39,781 25 | $10,822 00 |
| Calls | 04/26/85 | 100 | $3 50 | $209 25 | $35,209 25 | 05/20/85 | $6 75 | $301 25 | $67,198 75 | $31,989 50 |
| Calls | 06/26/85 | 100 | $2 38 | $209 25 | $23,959 25 | 07/01/85 | $3 13 | $209 25 | $31,040 75 | $7,081 50 |
| Calls | 07/18/85 | 100 | $5 00 | $248 75 | $50,248 75 | 07/23/85 | $3 75 | $211 25 | $37,288 75 | ($12,960 00) |
| Puts | 08/13/85 | 100 | $3 25 | $209 25 | $32,709 25 | 08/26/85 | $2 75 | $209 25 | $27,290 75 | ($5,418 50) |
| Puts | 09/16/85 | 100 | $2 25 | $209 25 | $22,709 25 | 09/26/85 | $2 50 | $209 25 | $24,790 75 | $2,081 50 |
| Calls | 11/05/85 | 100 | $4 88 | $245 00 | $48,995 00 | 12/18/85 | $19 63 | $687 50 | $[illegible]25,562 50 | $146,567.50 |
| Calls | 01/27/86 | 100 | $3 25 | $209 25 | $32,709 25 | 03/04/86 | $10 88 | $425 [illegible] | $108,325 00 | $75,615 75 |
| Calls | 03/12/86 | 100 | $4 75 | $241 25 | $47,741 25 | 04/29/86 | $9 63 | $3[illegible] | $95,862 50 | $48,121.25 |
| Calls | 05/21/86 | 100 | $4 50 | $233 75 | $45,233 75 | 06/09/86 | $9 75 | [illegible] | $97,108 75 | $51,875 00 |
| Calls | 08/06/86 | 100 | $4 13 | $222 50 | $41,472 50 | 09/05/86 | $12 75 | [illegible] 25 | $127,018 75 | $85,546 25 |
| Calls | [illegible] | 100 | $4 50 | $233 75 | $45,233 75 | [illegible] | $[illegible] | [illegible] | $[illegible] | $23,211 25 |
| Calls | 11/25/86 | 100 | $4 13 | $222 50 | $41,472 50 | 12/19/86 | $[illegible] | $245 00 | $48,505 00 | $7,032 50 |
| Puts | 01/02/87 | 100 | $2 38 | $209 25 | $23,959 25 | 01/05/87 | [illegible] | $209 25 | $9,790 75 | ($14,168 50) |
| Calls | 01/08/87 | 100 | $6 75 | $301 25 | $67,801 25 | 02/03/87 | [illegible] 63 | $987 [illegible] | $295,262 50 | $227,461 25 |
| Calls | 03/05/87 | 100 | $3 50 | $209 25 | $35,209 25 | 03/1[illegible] 94 | $20[illegible] | [illegible] | $29,165 75 | ($6,043 50) |
| Calls | 03/20/87 | 100 | $4 75 | $241 25 | $47,741 25 | 04/0[illegible]/87 | $8 25 | [illegible] | $82,153 75 | $34,412.50 |
| Calls | 05/06/87 | 100 | $3 75 | $211 25 | $37,711 25 | 05/0[illegible]/87 | $2 25 | [illegible] | $22,290 75 | ($15,420.50) |
| Puts | 05/19/87 | 100 | $4 88 | $245 00 | $48,995 00 | 06/11/87 | $7 50 | [illegible] 75 | $74,676 25 | $25,681 25 |
| Calls | 06/17/87 | 100 | $4 25 | $226 25 | $42,[illegible] 25 | 07/16/87 | [illegible] | $346 25 | $82,153 75 | $39,427.50 |
| Calls | 07/31/87 | 100 | $3 13 | $209 25 | $32,[illegible] 25 | 08/06/87 | [illegible] | $248 75 | $49,751 25 | $18,292.00 |
| Calls | 08/10/87 | 100 | $5 88 | $275 00 | [illegible] 00 | 08/26/87 | [illegible] | $509 25 | $136,390 55 | $77,365 55 |
| Puts | 09/09/87 | 100 | $4 38 | $230 00 | [illegible] 00 | 09/[illegible] | [illegible] 63 | $[illegible] | $36,040 75 | ($7,939 25) |
| Puts | 10/08/87 | 100 | $7 75 | $3[illegible] | [illegible] | [illegible] | [illegible] 97 00 | [illegible] | -$967,242 50 | $889,439.37 |
| Puts | 11/10/87 | 100 | $5 00 | $24[illegible] | $50,[illegible] 75 | [illegible] | $5 69 | [illegible] | $56,605 63 | $6,356.88 |
| Calls | 11/13/87 | 100 | $3 50 | $203 75 | $35,2[illegible] 75 | [illegible]/24/87 | $2 38 | [illegible] 25 | $23,540.75 | ($11,663.00) |
| Calls | 12/15/87 | 100 | $3 13 | $209 [illegible] | $31,4[illegible] 25 | 12/24/87 | $8 [illegible] | [illegible] | $84,646 25 | $53,187.00 |
| Calls | 02/11/88 | 100 | [illegible] | [illegible]9 25 | [illegible],70[illegible] | 03/17/88 | [illegible] | $327 50 | $75,922 50 | $53,213.25 |
| Puts | 03/25/88 | 100 | [illegible] | [illegible]09 25 | [illegible],959 25 | 04/05/88 | [illegible] | $267 50 | $55,982 50 | $22,023.25 |
| Calls | 05/16/88 | 1[illegible] | [illegible]4 6[illegible] | $237 50 | [illegible]87 50 | 05/[illegible] | [illegible] 25 | $25[illegible] | $52,243 75 | $5,756.25 |
| Calls | 05/26/88 | 100 | [illegible] | $226 25 | [illegible],726 [illegible] | 06/2[illegible]/88 | $15 00 | $54[illegible] | $149,451 25 | $106,725.00 |
| Calls | 08/01/88 | 100 | [illegible] 00 | $21[illegible] | $40,21[illegible] | [illegible]/05/[illegible] | $2 63 | $209 [illegible] | $26,040 75 | ($14,178.00) |
| Puts | 08/10/88 | 100 | $4 00 | $21[illegible] | $40,[illegible] | [illegible]/24/[illegible] | $7 [illegible] | [illegible] | $73,430 00 | $33,211.25 |
| Puts | 10/05/88 | 100 | $3 25 | $20[illegible] | [illegible] | [illegible]/10/88 | $2 [illegible] | [illegible] 25 | $19,790 75 | ($12,918.50) |
| Calls | [illegible] | [illegible] | [illegible] 50 | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | $39,[illegible] 36 |
| Calls | 01/09/89 | 100 | $7 13 | $312 50 | [illegible],2[illegible] 00 | 02/09/89 | [illegible] 00 | $638 75 | $179,361 25 | $107,798.75 |
| Calls | 02/17/89 | 100 | $6 25 | $286 25 | $62,[illegible]6 25 | 02/[illegible]/89 | $[illegible] | $256 25 | $52,243 75 | ($10,542 50) |
| Puts | 02/23/89 | 100 | $3 75 | $211 25 | [illegible],711 25 | 03/[illegible]/89 | $[illegible] | $245 00 | $48,505 00 | $10,793 75 |
| Calls | 03/06/89 | 100 | $5 63 | $267 50 | [illegible]6,517 50 | [illegible]/17/89 | [illegible] 38 | $350 00 | $83,400 00 | $26,882.50 |
| Calls | 03/29/89 | 100 | $6 38 | $290 00 | $64,040 [illegible] | 0[illegible]/02/89 | $[illegible] 75 | $421 25 | $107,078 75 | $43,038 75 |
| Puts | 05/10/89 | 100 | $2 63 | $209 25 | $26,45[illegible] | 0[illegible]/12/89 | $1 75 | $209 25 | $17,290 75 | ($9,168.50) |
| Calls | 07/06/89 | 100 | $5 75 | $271 25 | $57,[illegible] | 0[illegible]/14/89 | $25 00 | $673 25 | $249,326 75 | $191,555.50 |
| Calls | 08/24/89 | 100 | $3 63 | $209 25 | $3[illegible] 25 | 08/25/89 | $8 13 | $342 50 | $80,907 50 | $44,448 25 |
| Calls | 09/28/89 | 100 | $4 13 | $222 50 | $41,[illegible] | 10/09/89 | $11 25 | $436 25 | $112,063 75 | $70,591.25 |
| Calls | 12/29/89 | 100 | $4 13 | $222 50 | $41,[illegible] 50 | 01/03/90 | $8 25 | $346 25 | $82,153 75 | $40,681 25 |
| Puts | 01/09/90 | 100 | $5 50 | $263 75 | $55,263 75 | 01/15/90 | $13 00 | $488 75 | $129,511 25 | $74,247.50 |
| Puts | 01/16/90 | 100 | $8 75 | $361 25 | $87,861 25 | 01/24/90 | $14 88 | $545 00 | $148,205 00 | $60,343.75 |
| Puts | 02/21/90 | 100 | $4 25 | $226 25 | $42,726 25 | 02/26/90 | $2 94 | $186 88 | $29,188 13 | ($13,538.13) |
| Calls | 03/16/90 | 100 | $6 63 | $297 50 | $66,547 50 | 03/20/90 | $10 00 | $398 75 | $99,601 25 | $33,053.75 |
| Calls | 04/12/90 | 100 | $5 50 | $263 75 | $55,263 75 | 04/16/90 | $8 25 | $346 25 | $82,153 75 | $26,890 00 |
| Puts | 04/19/90 | 100 | $5 00 | $248 75 | $50,248 75 | 04/27/90 | $10 00 | $398 75 | $99,601 25 | $49,352.50 |
| Calls | 05/08/90 | 100 | $4 75 | $241 25 | $47,741 25 | 05/14/90 | $19 25 | $676 25 | $191,823 75 | $144,082.50 |
| Calls | 06/22/90 | 100 | $6 63 | $297 50 | $66,547 50 | 06/25/90 | $3 63 | $207 50 | $36,042 50 | ($30,505 00) |
| Puts | 08/07/90 | 100 | $7 88 | $335 00 | $79,085 00 | 08/24/90 | $22 25 | $766 25 | $221,733 75 | $142,648.75 |
| | | | | | | | | | | $3,047,868.67 |

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Circle 33 on reader service card.


and the Max Hex—the products that, basically, kept Apple in business. "I felt the strain," admits Cheung. "The whole company was on our back."

The designers had to fight off the deadline pressure and focus on the computer itself. "Even though we knew it was important to get it out," says Baker, "we had to do the right thing."

Every detail took on importance, and that certainly included the physical appearance of the new computer. Once the built-in keyboard was scratched, the designers considered all sorts of weird approaches. For a while, recalls Bill Goins, people were charmed with a "boom-box" shape—a long rectangle that you could, if you wished, transport on your shoulder. But since a boom box cannot support a computer monitor, that idea died a wistful death. Eventually, the industrial designers came up with a distinctive shape—a flat box, something like a squashed MacBottom disk drive, with a slightly sweeping curve in front. Originally, Jean-Louis Gassée objected to the curve. But the Elsie team, resilient to rebuffs, decided to take an internal poll on the matter. The vote was 22-to-1 in favor, when John Sculley chanced by.

"What's the score so far?" he asked, and was informed of the tally.

"Make that 23 to one," he said, and that settled the matter.

The designers had to make one more big adjustment on the LC—its method of producing color. All along, the idea was to use 4-bit color, which would demand less of the processor and the monitor. But the first few developers who saw the prototype complained. The Macintosh standard, they said, was the high-resolution, 8-bit color of the Mac II. Why make wimpy Macs? The objection made sense. "If we released it with 4-bit color, we'd have a new (and inferior) software standard—we'd be living with it forever," says Wayne Dyer, the Macintosh product marketing manager.

The design team members came to realize that despite the expense it would incur, 8-bit color was the right thing to do. Typically, they did not inform their superiors that The Plan had changed, but began to quietly

*(continues)*

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Circle 317 on reader service card.

Circle 39 on reader service card.


implement it in their spare time. So by the time they revealed to the executives that the LC absolutely, positively had to have 8-bit color, the design team was able to show how this could be pulled off—indeed, they had done it.

### Off the Books

That sort of anecdote is repeated over and over again when the designers recount the tale of the Mac LC. It was a computer essentially hatched from the bottom up. When the putative wise men in charge of the company would strike down a part of the plan, or even the entire project, Paul Baker, H. L. Cheung, and the others kept going, even if it meant that things were carried off the books for a while. Persistence paid off—we now have the Mac LC. "This can be another Apple IIe, or Plus, or SE," says H. L. Cheung, not doing much of a job of hiding his pride.

Speaking of the Apple IIe, one of the neatest things about the LC is its ability to emulate that computer with the addition of a board that sells for under $250. Just the sight of an old copy of Raster Blaster running on a Mac can make an old Apple II owner get all misty. Rather more significantly, this ability will enable the Mac to smoothly replace the hundreds of thousands of Apple II machines in schools—and probably rescue the company from oblivion in the crucial kindergarten to 12th-grade market.

But the Apple II emulation board almost didn't make it out of the gate. In mid-1989, Jean-Louis Gassée killed it outright. Just said no. What did the engineers do? "The design team never missed a lick," says Bill Goins. "They just kept working on it." And when engineer Rob Moore finally produced a prototype that worked, the executive staff of course was convinced that the skunkworks emulation-board operation was justified.

But that's the story of the Macintosh LC itself: the low-cost color computer that Apple produced in spite of itself. ◻

*Steven Levy, a* Macworld *columnist, is currently writing a book on artificial life.*

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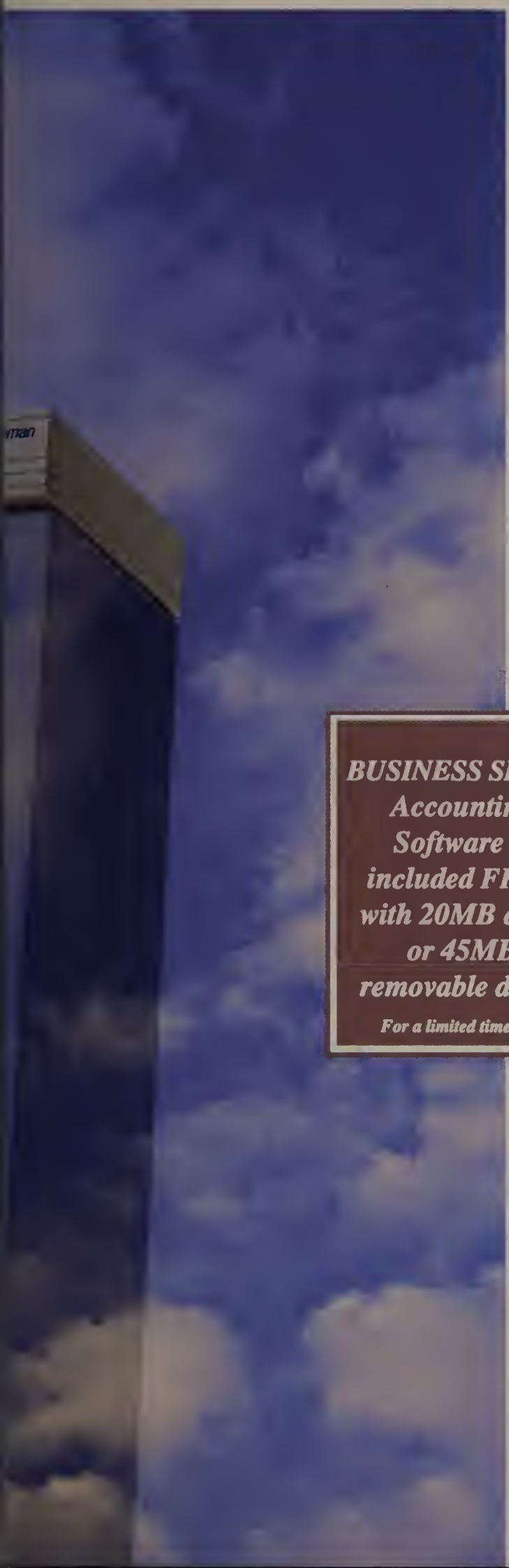

A leading magazine recently polled over 1,400 Macintosh volume buyers on their peripheral preferences. Not surprisingly Radius was the winner among third party monitor manufacturers, while Hewlett-Packard was the leader in printers. Some people may be surprised, however, at the choice for the leading independent hard drive company, Ehman.

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## THE FDA PRESSES COMPUTER MANUFACTURERS FOR ACTION

BY DEBORAH BRANSCUM

There may be clear-cut issues somewhere out in science land, but the effect of low-level electromagnetic emissions on human health is not one of them. The problem is simple: scientists know enough to say that emissions may be hazardous but not enough to explain how or why. And it's a significant concern: electromagnetic fields are emitted by power lines, electric blankets, and other appliances, as well as personal computers.

"We're in that intermediate time period between when you first really suspect that something is going on and when you have a real good handle on it," said Dr. F. Alan Andersen of the Food and Drug Administration (FDA). Federal officials I interviewed said low-frequency emissions are particularly tricky to study, and the research that has been conducted to date has been inconsistent. But the belief expressed in our July cover story that there is real reason for concern is being echoed by government officials.

"What I believe personally is that the epidemiological evidence is overwhelming. There are too many exceptionally good-quality studies," said Martin Halper, director of the Analysis and Support division of the Office of Radiation Programs of the Environmental Protection Agency (EPA). "When you have 64 studies done all over the world, with all different kinds of populations, you start getting to the point where you say it's statistically impossible that a single nonweighted factor could be, in fact, responsible for these cancers across all of these diverse populations. . . . The weight of the evidence starts mounting that there is something real here. . . . Clearly, we have to keep looking. My guess is that we will wind up with Congress ultimately passing legislation."

WIDE WORLD PHOTOS

> I WOULD SUGGEST THAT [APPLE] DIDN'T HAVE ENOUGH INFORMATION TO USE THE SAFE WORD
>
> **DR. F. ALAN ANDERSEN, FDA**

### Pressing for Action

The FDA, which regulates devices that emit radiation, isn't waiting for legislation. One official wants computer manufacturers to dramatically reduce low-frequency electromagnetic emissions now. "In effect, as low as reasonably achievable ought to be the goal," said Dr. Andersen, acting director of the FDA's Center for Science and Technology within the Center for Devices and Radiological Health, in Rockville, Maryland. "This is public credibility that you're dealing with here. It's not time to nickel and dime it to death. We haven't talked about actual costs. But the goal is to reduce emissions. Period."

The FDA's stance is news to some in the computer industry, however. "Any conversations we've had with them [FDA officials] indicate that they don't sense there is a problem, and therefore they have not done anything about it and don't really intend to do anything about it," said Ted Heydinger, vice president of the Computer and Business Equipment Manufacturers Association (CBEMA), a computer industry organization located in Washington, D.C. That the FDA has not spread the word is dis-

*(continues)*

WIDE WORLD PHOTOS

THE EPIDEMIOLOGICAL EVIDENCE [REGARDING ELECTROMAGNETIC FIELDS] IS OVERWHELMING. . . . MY GUESS IS THAT WE WILL WIND UP WITH CONGRESS ULTIMATELY PASSING LEGISLATION

MARTIN HALPER, EPA

tressing, considering that a group of Macintosh manufacturers, including Radius and SuperMac, pledged last summer to consider the emissions issue through CBEMA and similar industry organizations.

CBEMA may not have heard the news, but at least IBM and Apple got the message at an American Electronics Association quarterly meeting in Washington, D.C., in late July. During that meeting, Dr. Andersen gave the two companies his pitch. "At a minimum, if you can lower the emissions you ought to, is the position that we've been taking," he said. "We have gotten a very positive response to that argument. My understanding is that there is going to be a movement toward a voluntary standard of reduced emissions for VDTs [video display terminals]. And that there won't be any question about people going along with it because they're reasonably convinced that they have no choice at this point."

Apple might not agree with that characterization, but the company does appear to be headed for a voluntary reduction in monitor emissions. "Internally, we are investigating ways to lower the emissions of our products to respond to consumer concern," Apple's Marianne Lettieri told me. "We are responding because we want to give people peace of mind." I asked her how Apple could say that computers are safe, when an EPA draft report on electromagnetic fields states that 60Hz magnetic fields are a possible, but not proven, cause of cancer. Her response: "There are no scientific guidelines which we can target and no clear opinion that there is a health risk. We're very aware of the debate. And we know there are legitimate questions, and we want answers too." When I commented on the frustration that was audible in her voice, the spokeswoman asked what I thought Apple should do. When I mentioned the new Swedish purchasing guidelines, she almost exploded. "We want answers. We are trying to be open-minded. That's why we're willing to put money, time, and effort behind this issue. But you're asking us to target something that doesn't exist. Even the Swedish procurement [specification] is based on what is achievable. But is it safe? No one knows."

### Quiet Movement

Apple and other companies in the industry say they are working to establish emission testing and measurement standards, presumably as a preliminary to actually reducing emissions. As a group, it seems likely that computer makers will follow the lead of Sigma Designs, which has pledged to offer a monitor that meets Swedish guidelines for extremely-low-frequency (ELF) magnetic emissions by the end of the first quarter of 1991. (The company already offers a monitor with reduced emissions in the very-low-frequency range.)

As computer companies ponder their choices, federal agencies responsible for health, safety, and radiation issues are examining existing research and looking for gaps.

• In November, the FDA's Technical Electronic Products Radiation Safety Standards Committee is meeting to discuss electromagnetic emissions and steps electric blanket manufacturers are taking to reduce such emissions. Some computer manufacturers have been invited as well, to give them the opportunity to "brag a little" about the progress they're making, Dr. Andersen said.

• A National Institute for Occupational Safety and Health (NIOSH) study of more than 1000 computer users and pregnancy is scheduled for completion by the end of this year. In addition, NIOSH is convening a scientific workshop in January with the goal of developing a national research strategy on the health effects of electromagnetic radiation on workers.

• The EPA's final evaluation of the potential carcinogenicity of electromagnetic fields is expected to be released in February. (A draft, issued in June, was controversial because a preliminary conclusion that electromagnetic fields should be classified as carcinogenic was left out of the version circulated for review.)

• An interagency committee, overseen by the White House Office of Technology, is supposed to report on existing studies sometime in the first half of next year. The group, called the Committee on Interagency Radiation Research and Policy Coordination, is looking at the issue in response to a request by both the Occupational Safety and Health Administration (OSHA) and the Office of Management and Budget.

Despite this flurry of activity, solid data about how electromagnetic fields affect our bodies won't be forthcoming for three to five years, according to the federal officials I met with in late September. It *is* promising that regulators are pushing for answers. But there's no guarantee that the resources needed to continue the research, or establish standards, will be forthcoming. And there are skeptics—inside and outside the White House—who don't agree that the issue is worth pursuing. That makes it all the more important that computer users make their voices heard in Washington (see *Commentary*, page 23 in this issue).

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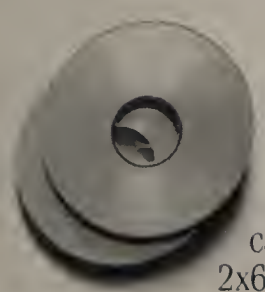

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THERE ARE NO MAJOR HEALTH RISKS ASSOCIATED WITH USING VIDEO DISPLAY TERMINALS. . . . WE DIDN'T SAY THEY WERE SAFE

**DR. WILLIAM HENDEE, AMA**

And it makes it especially critical that manufacturers follow up on their pledges to reduce emissions.

### Apple's Testimony

In July, Dr. David Nagel, vice president of Apple Computer's Advanced Technology Group, testified before Congress that "the preponderance of expert technical opinion to date is that VDTs are safe. This position is supported by the American Medical Association (AMA), the American College of Obstetricians and Gynecologists, NIOSH, and the World Health Organization (WHO)."

In Chicago, I met with AMA vice president Dr. William Hendee and asked him if Apple's statement was fair. His answer: "In the opinion of the AMA, scientific evidence indicates that there are no major health risks associated with using video display terminals." I pressed Dr. Hendee on the difference between saying that evidence is inconclusive and saying something is safe. "We didn't say they were safe. That's a conclusion that was offered in testimony as an interpretation of what we and other organizations have said. Saying something is safe is an interesting dilemma. I'm not sure you can ever say something is safe if you mean absolutely without risk. I don't know of anything that's without risk." He agreed that in the absence of more information, the suggestion to sit at arm's length from your computer is a good one.

In Washington, I was not allowed to interview an official of the American College of Obstetricians and Gynecologists, but a spokeswoman assured me that Apple's testimony was "fine."

OSHA's Dr. Sheldon Weiner, director of the Office of Standards Analysis and Promulgation, told me his agency has no position on the safety of electromagnetic emissions. "We're looking at all the information and studies. . . . The possibility that magnetic fields may be hazardous is a relatively new thing—there's not a lot of conclusive evidence."

In an interview in Cincinnati, Dr. Lawrence Fine, NIOSH director of Surveillance, Hazard Evaluations, and Field Studies, said the agency's basic position is that NIOSH has not found computers to be a source of dangerous radiation, but that the agency would continue to monitor scientific studies. "One thing that should be clear to your readers is that the relative risk that has been observed in studies for electromagnetic radiation are not, in general, tenfold increased risks," Fine said. "The relative increased risk is at the low end."

In Geneva, Switzerland, a WHO specialist in radiation said he was not concerned at all about his exposure from personal computers and seemed untroubled by Apple's statement.

But that's not the end of the story.

### Times Have Changed

"It is clear that there is concern; concern both in the lay community and in the scientific community about whether there may be some hazards from this radiation," said Dr. Fine. "And depending on the individual scientists who review it, they may say there is some evidence, a little evidence, no evidence, substantial evidence. The bottom line of that is there's uncertainty."

Simply put, the issue can no longer be dismissed. "When the literature began appearing, you could find a fatal flaw in all the studies, something that allowed you to say, I don't believe it," said Dr. Andersen. "Five years ago there was lots of inconsistent animal data and human studies with fatal flaws. There was not enough of a basis for anyone to act. That has changed. We're still mostly seeing human studies, but what you hear is the phrase 'suggested association'. . . . That, for us, means you can't ignore that there may be a relationship between exposure to ELF and adverse health effects. It's frustrating, because it's not a complete story. We can't dismiss it, but what is truth?"

I don't know what truth is. The people I interviewed about electromagnetic emissions said that any risk of adverse health effects, if it exists, is probably small. They also said that regulatory action is dependent on enough data to make a risk assessment (and so far there's not enough data) and evidence that regulation would not be unduly expensive to industry. One computer industry insider told me that "our role here is to pressure the government to provide standards. We want someone to make some decisions, someone who's interested in the public health." Another source worried that by writing this column I would discourage companies from moving forward; that manufacturers need encouragement, not criticism, to take action.

I do applaud those companies that are sincerely working to reduce emissions, but I also believe it's time the industry stopped proclaiming that computers are safe and admit to uncertainty. As Dr. Andersen conceded, after I pressed him, "I would suggest [Apple] didn't have enough information to use the safe word."

But Apple is not the enemy—the enemy is ignorance. To their credit, Apple and others have called for additional research, for establishing testing and measurement procedures, and for establishing standards. That's a great start. But it's not enough. Manufacturers need to lower monitor emissions. Now. ◻

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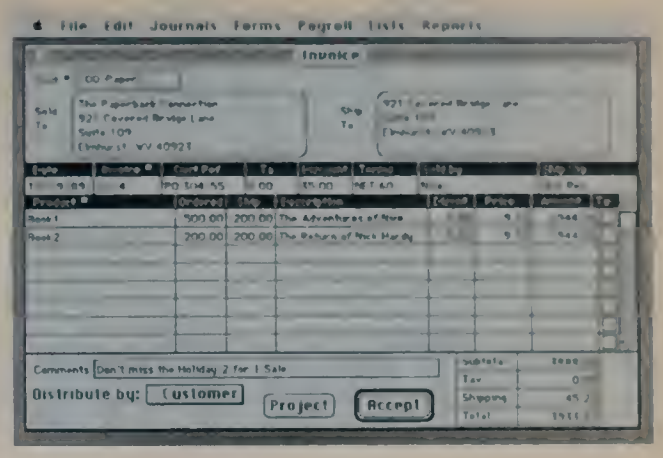


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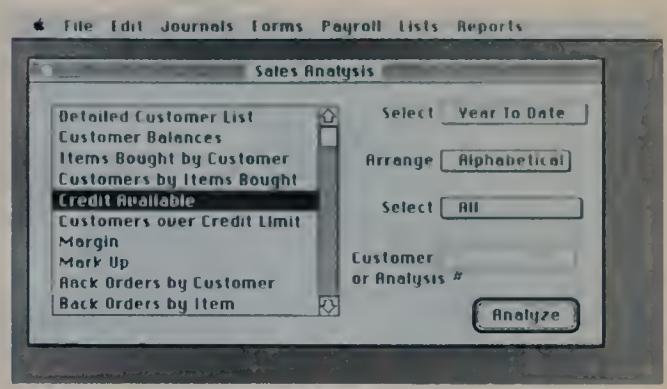


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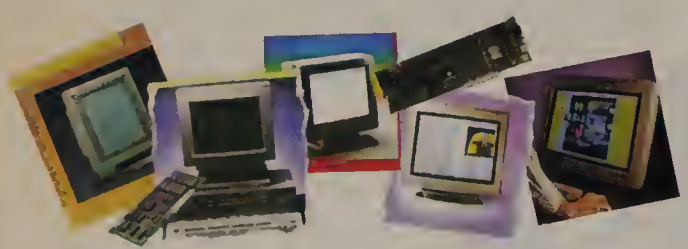

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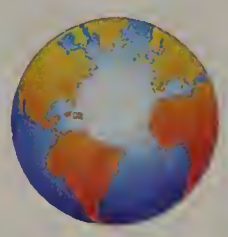

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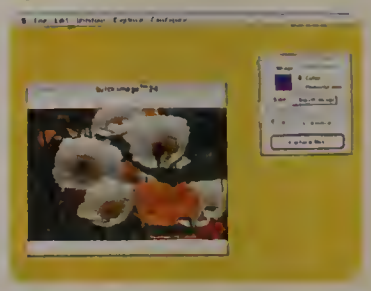

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# Upping the Speed of Light

## Mac graphics are getting a boost, but Apple-built roadblocks limit the speed

BY BRUCE F. WEBSTER

Shortly after 24-bit color boards appeared for the Mac, the call went out for graphics accelerators. Having photo-realistic images on screen is nice, but not when it takes forever to scroll a window or paint a stroke. And the market has responded with a variety of solutions. Unfortunately, it's not always easy to judge which solution—if any—best meets your needs.

Why would you want graphics acceleration at all? Well, to make 24-bit color perform acceptably, meaning as fast as or faster than 8-bit color.

Besides that, some applications have special needs for graphics acceleration. Examples include animation and multimedia packages, integrated video boards, and computer-aided design (CAD) packages. These applications place particular burdens on the Mac's ability to render and display graphics quickly.

The ultimate reason, though, is to eliminate the distractions and barriers between what you envision and what you accomplish—in the words of Steve Edelman at SuperMac, "to make the computer invisible." When you pick up a real apple and turn it around, it doesn't move in fits and starts, redrawing itself each time a new portion comes into view. The real-world images you see flow by seamlessly, however fast you care to move the apple. A virtual apple, modeled within the Mac, should have the same characteristics: photo-real image and real-time motion with no visible glitches. In short, the highest aspiration is for the digital Mac to emulate analog reality. We're quite a ways from that, but it provides a good long-range goal.

### Terms of Enhancement

At least four acceleration issues suggest themselves: overall approach, software level, hardware level, and accelerator location. Here's a look at each.

There are two basic approaches to graphics acceleration: display-list processing and general acceleration. Display-list processing, termed "an aberration of the eighties" by Dave Smith of RasterOps, uses custom hardware to help applications manage and render complex images comprising lots of individual elements. It requires that each application use special drivers to access the display-list hardware, providing no benefits for applications not rewritten to use those drivers. By contrast, general acceleration focuses on increasing the speed of system graphics libraries. That benefits all applications without any special rewriting. The consensus among developers is that display-list processing is a dead end; almost all solutions currently on the market use a general-acceleration approach.

The next issue is which level(s) or section(s) of the system graphics routines—QuickDraw—to accelerate. The choices range from high-level QuickDraw calls (which is what the Apple 8•24 GC board accelerates), to key general-purpose routines (Radius's approach), down to very low-level sections of code (which SuperMac and

RasterOps have done). Difficulties abound at each level. Apple is finding its QuickDraw rewrite (into the C language, to compile to AMD-29000 RISC instructions) is going more slowly than anticipated, causing repeated delays in the shipment of the 8•24 GC board. The third-party companies take a simpler approach, aiming at lower levels of functionality. In part, they do this to avoid undue complexity; mostly, though, they do this because Apple will not give them internal details of QuickDraw, so they are limited to modifying that which they can decipher and patch.

Related to those choices are decisions about hardware implementation. The first approach uses a general processor to carry out graphics functions. This can be a special-purpose graphics processor (such as the TI 34010), a reduced-instruction-set chip (RISC) processor (such as the AMD 29000), or even a general-purpose processor (such as the Motorola MC68000). In the Macintosh market, RISC processors have proven most popular because of their combination of high

*(continues)*

speed and general function. Certain system graphics routines are rewritten by developers to run on a RISC processor; standard calls to those routines are intercepted and rerouted from the Mac's processor to the RISC processor. This allows a great deal of flexibility; for example, Apple has discussed supporting both QuickDraw and the X Windowing system on the AMD 29000 RISC processor used on its 8•24 GC video board. This solution also requires lots of development time (which explains the aforementioned delays in the 8•24 GC shipping date).

The second hardware approach is to implement key functions using custom silicon chips. For example, routines to do *bit blitting*—moving bitmaps from one location to another—can be replaced by custom hardware that does the same thing. This technique provides a much greater speed increase than the general-processor approach but offers much less flexibility, since the routines are cast in stone (or at least in silicon). This presents the problem of potential obsolescence should Apple radically change its imaging model. The vendors' solution: limit the routines so implemented to basic, common functions unlikely to change.

The ideal hardware approach is a combination of the two techniques: key low-level functions implemented in silicon, with another layer of graphics routines running on a general processor. Most manufacturers seem to be moving in this direction.

The last issue is whether to put an accelerator directly on the video graphics board, or to keep it on a separate NuBus board. The former approach yields (theoretically, anyway) the greatest speed increases, since the accelerator can directly interface with the video frame buffer (the RAM that actually holds the graphics images). This approach also offers a single-slot solution, an important consideration since roughly half of Apple's lineup (the Mac SE/30, Mac LC, and Mac IIsi) has only one slot available. The separate-board accelerator offers greater flexibility, since it can be replaced or upgraded independent of the video board(s) in the Mac system. A separate accelerator board can also serve several video boards.

### Speed Limits

There are, alas, some limits to how much graphics can be accelerated on the Mac. Some barriers are due to hardware architecture, others to software issues, but all point back to Apple.

The biggest hardware barrier is the lack of block-transfer capabilities between main memory and NuBus boards. This limits the data-transfer rate from, say, main memory to a video board to about 3.8MB per second—about one-tenth of the maximum rate using block transfers. This bottleneck has led to large frame buffers sitting on video boards (making the boards larger, hotter, and more expensive). *(continues)*

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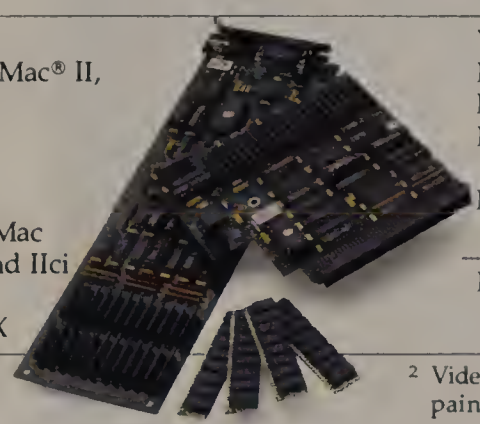

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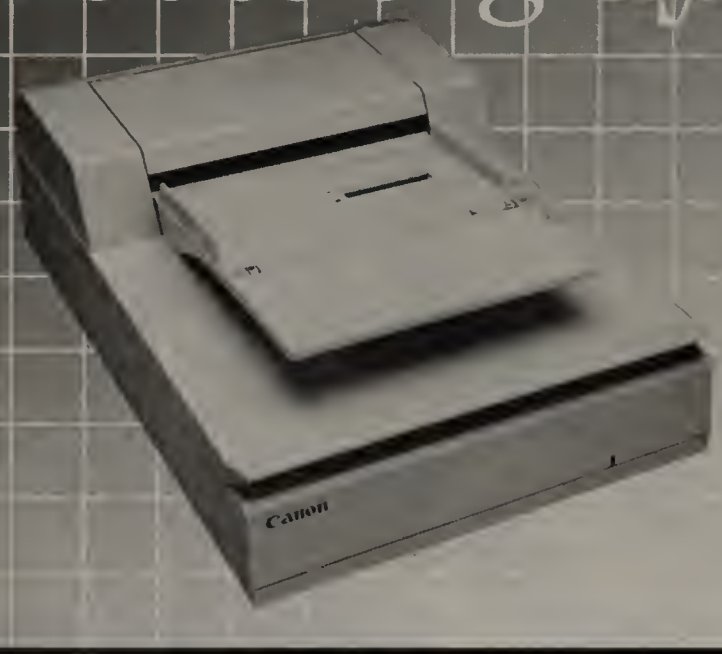


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Circle 164 on reader service card.

With block-transfer capabilities, the system CPU and main memory could be used to greater advantage.

A related issue is the balance between the system CPU and the graphics accelerator. If the accelerator is a lot faster than the CPU, you spend most of your time waiting for the CPU, and further speed increases can only come through a CPU upgrade. Likewise, other system bottlenecks (such as the NuBus issue above) limit the impact that an increase in CPU power has on graphics performance.

Less critical, but still useful, would be improvements in NuBus board-to-board transfer rates, which is also a bottleneck. The NuBus'90 specification (also mentioned two months ago) would double the transfer rate between NuBus boards to upwards of 78MB per second, increasing the usefulness of separate-board accelerators and providing greater transfer rates between video boards and storage devices that use NuBus interfaces.

A major boost will come when color compression/decompression chips are widely (and cheaply) available. If significant hardware decompression were built into the video board an image could be restored quickly, and overall throughput would still be faster than moving the uncompressed image to the video board.

There are some software limitations to acceleration as well. The biggest is the complexity of QuickDraw itself, which comprises some 130K of complex object code. Apple provides little in the way of documentation or roadmaps to QuickDraw. On top of that, many QuickDraw routines are unraveled—using lots of fixed, repeated instructions instead of more general loops—to maximize performance. The result: accelerator developers have to disassemble, analyze, and figure out how best to patch in to QuickDraw while maintaining complete compatibility. Steve Becker at Radius refers to this as the band-aid approach; all sources outside Apple term it the single biggest frustration in developing effective accelerators.

### Breaking the Barriers

Why should Apple care about making life easier for firms developing graph-

*(continues)*

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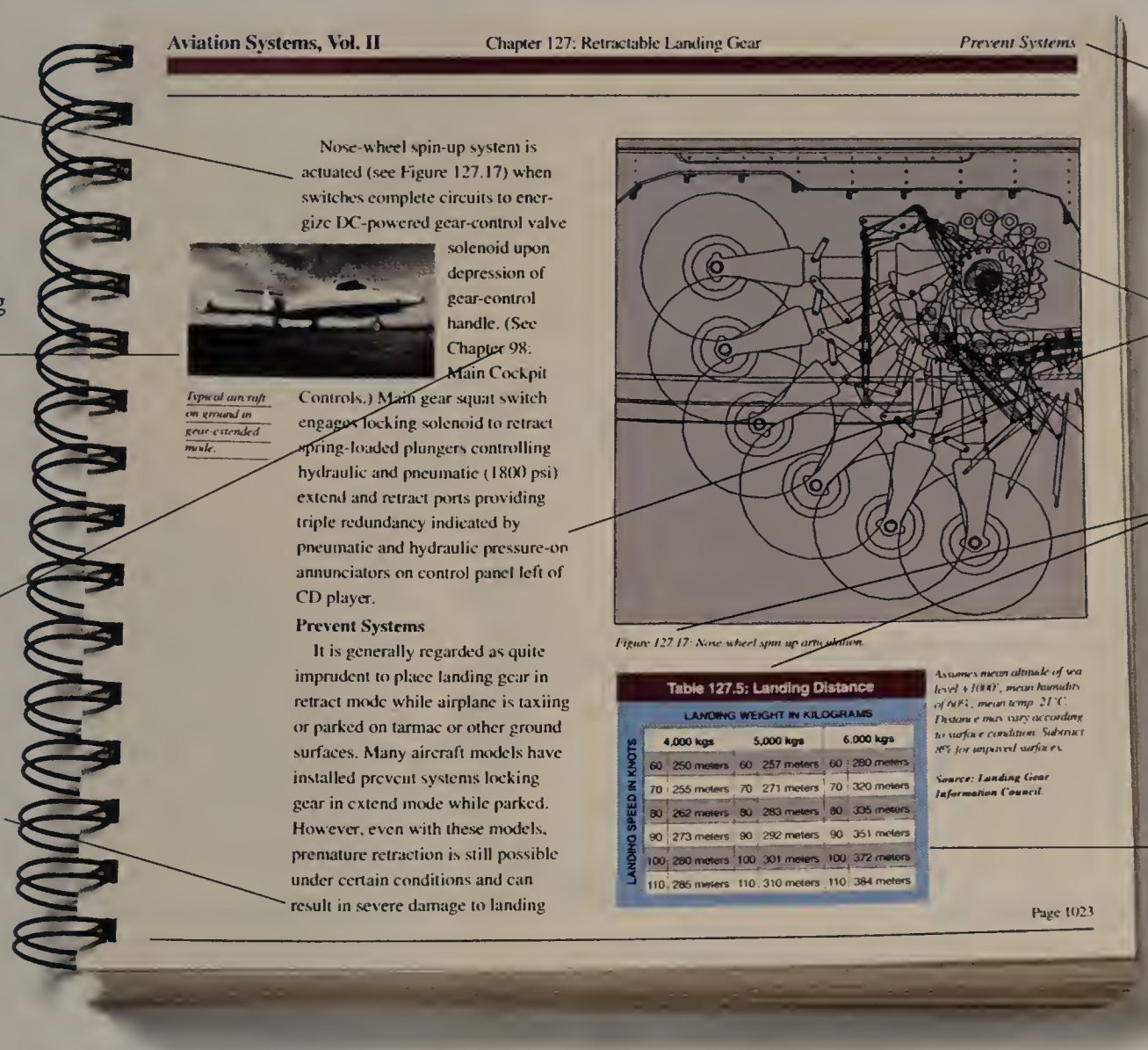

Aviation Systems, Vol. II  Chapter 127: Retractable Landing Gear  *Prevent Systems*

Nose-wheel spin-up system is actuated (see Figure 127.17) when switches complete circuits to energize DC-powered gear-control valve solenoid upon depression of gear-control handle. (See Chapter 98: Main Cockpit Controls.) Main gear squat switch engages locking solenoid to retract spring-loaded plungers controlling hydraulic and pneumatic (1800 psi) extend and retract ports providing triple redundancy indicated by pneumatic and hydraulic pressure-on annunciators on control panel left of CD player.

*Typical aircraft on ground in gear-extended mode.*

**Prevent Systems**

It is generally regarded as quite imprudent to place landing gear in retract mode while airplane is taxiing or parked on tarmac or other ground surfaces. Many aircraft models have installed prevent systems locking gear in extend mode while parked. However, even with these models, premature retraction is still possible under certain conditions and can result in severe damage to landing

*Figure 127.17: Nose-wheel spin-up arrangement.*

**Table 127.5: Landing Distance**

| LANDING SPEED IN KNOTS | LANDING WEIGHT IN KILOGRAMS: 4,000 kgs | 5,000 kgs | 6,000 kgs |
|---|---|---|---|
| 60 | 250 meters | 257 meters | 280 meters |
| 70 | 255 meters | 271 meters | 320 meters |
| 80 | 262 meters | 283 meters | 335 meters |
| 90 | 273 meters | 292 meters | 351 meters |
| 100 | 280 meters | 301 meters | 372 meters |
| 110 | 285 meters | 310 meters | 384 meters |

*Assumes mean altitude of sea level + 1000', mean humidity of 60%, mean temp 21°C. Distance may vary according to surface condition. Subtract 8% for unpaved surfaces.*

*Source: Landing Gear Information Council.*

Page 1023

Headers and footers can be automatically linked to selected text on each page.

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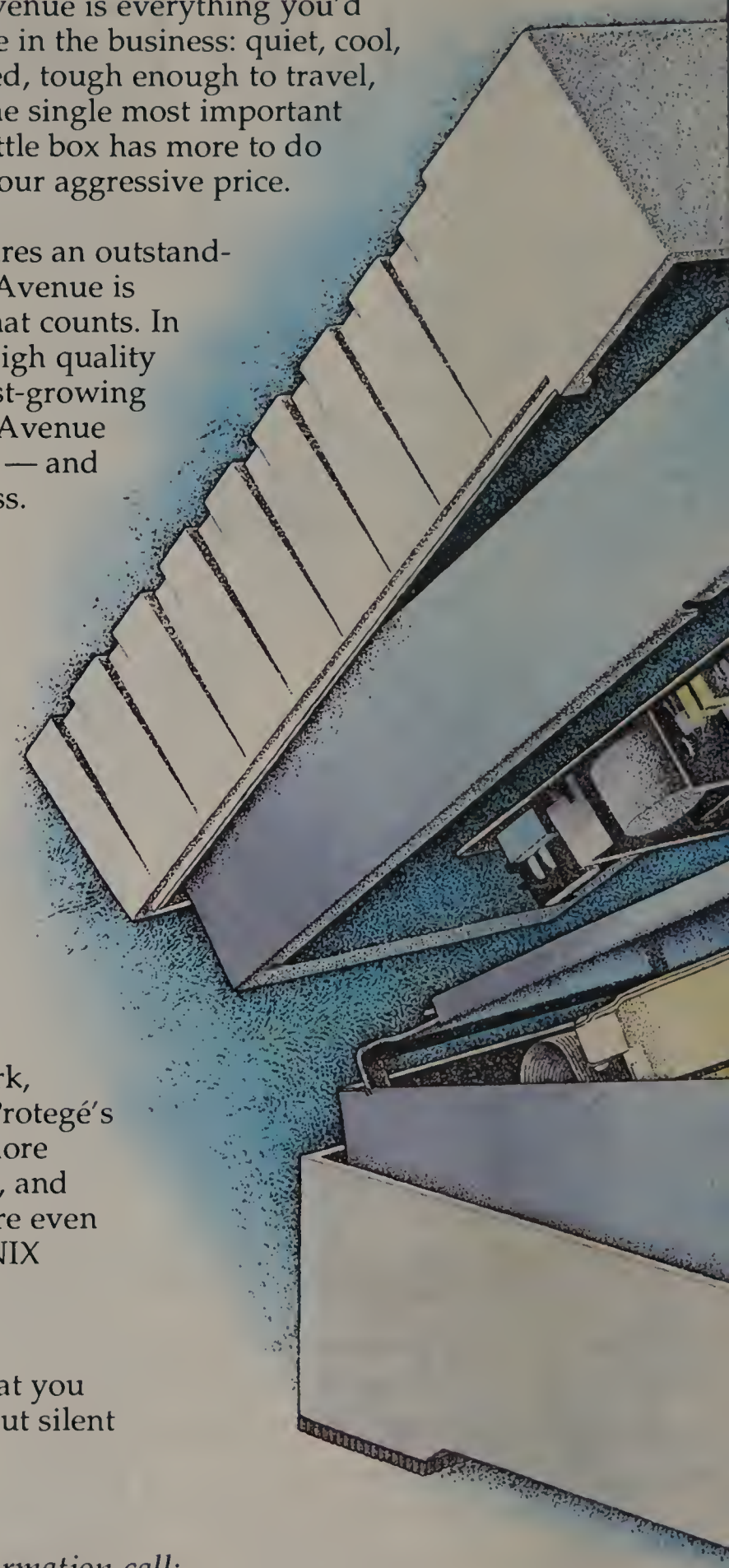
Circle 85 on reader service card

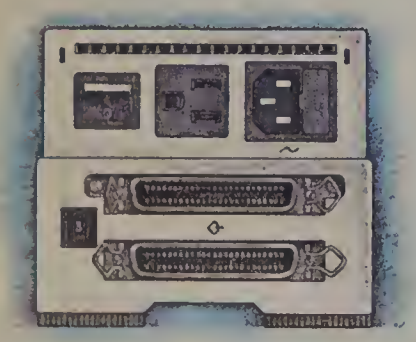
# Protegé: A Hot Deal on

The Protegé from MacAvenue is everything you'd expect from the best drive in the business: quiet, cool, quick, elegantly engineered, tough enough to travel, and priced to move. But the single most important feature of this handsome little box has more to do with its ancestry than with our aggressive price.

The Protegé hard drive features an outstanding pedigree. That's because the parent company of MacAvenue is CompuAdd, a computer industry leader in every way that counts. In value, performance, service and support. CompuAdd's high quality and low prices have made it one of *INC. Magazine's* fastest-growing companies for three years running. So even though MacAvenue is a new kid on the block, we showed up with the smarts — and the resources — to build you the best drive in the business. And sell it to you for the best price on the market.



Here's how the Protegé will turn you on:



***Attention to Details***
Even the back of the Protegé is loaded with smart features. Like an extra power outlet for other drives or peripherals. A push-button SCSI ID setting. And an external terminator for convenience.

***Loaded with Smart Software***
Your Protegé will arrive pre-formatted and ready for work, loaded with easy-to-use, custom-designed utilities. The Protegé's Disk Management Software allows you to partition for more efficient drive operation, password protect each partition, and easily access partitions via the Control Panel. The software even allows for disk spanning and creation of ProDOS and UNIX partitions.

***Hear a Pin Drop***
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# MacAvenue: More Than A Source, A Resource...

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Top-notch engineering makes the **Protegé** cool, quiet and reliable — the best hard drive for your Macintosh. With features like external termination, push-button SCSI address selector and custom-designed "Disk Master" Disk Management Software, the **Protegé** is easy to operate. Bundled with *OnLocation*, the best file-finding utility — a $124.95 value — Free!

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MacAvenue Protegé Carrying Case 26908 ..... $24

See listings below for more Protegé drives

# Hardware

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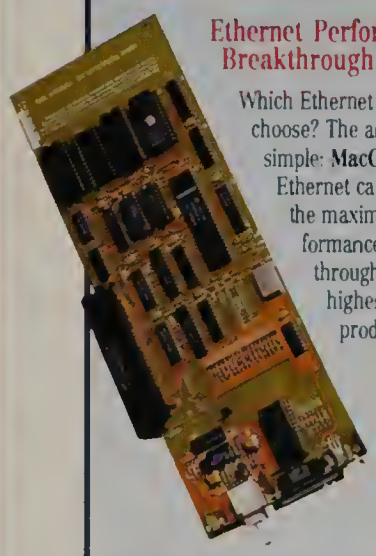
24381 40MB Ext. Protegé HD ..... $395
24382 80MB Ext. Protegé HD ..... $525
24383 100MB Ext. Protegé HD ..... $649
24390 40MB Ext. Qtm. Protegé HD .. $455
24391 80MB Qtm. Protegé HD ..... $645
24392 105MB Ext. Qtm. Protegé HD $695
24180 20MB Int. HD - SE ..... $295
24181 40MB Int. HD - SE ..... $325
24182 80MB Int. HD - SE ..... $465
24183 100MB Int. HD -SE ..... $575
24184 20MB Int. HD -Mac II ..... $295
24185 40MB Int. HD -Mac II ..... $325
24186 80MB Int. HD -Mac II ..... $465
24187 100MB Int. HD -Mac II ..... $575



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**Irwin Magnetics**
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23833 5080/120 Tape Backup ..... $795
**IOmega**
24384 Bernoulli 40-40 ..... $2,195
24385 Portable 44MB ..... $1,850

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26080 QT-80MB/2 Cart. ..... $85

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22758 Computer Eyes B/W Scan ..... $196
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22701 DoveFax-Ext. ..... $289
**Epson**
56303 LX 810 - 9 pin Prtr. ..... $185
56339 LQ-2550 - 24 pin Prtr. ..... $910
56340 LQ-510 - 24 pin Prtr. ..... $289
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22751 ScanMan 32 ..... $319
**MicroTek-IMSI**
22755 300Z Color Scanner ..... $1,945
22756 MS-II B&W Scanner ..... $1,080
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22700 TeFAX RA2110 ..... $1,095
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23056 Envelope Feeder ..... $299
23058 2nd Paper Drawer w/Ltr. Tray $325
**Thunderware**
22757 Thunderscan Plus ..... $199

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**Applied Eng.**
22306 Datalink Express ..... $169
22307 Datalink Mac ..... $199
22308 Datalink Macport. ..... $199
22309 MMPL5 Protocal adapt. ..... $79
22310 Send Fax Adapter ..... $79

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49557 2400 Ext w/o SW ..... $129
**Hayes**
49501 Smartmodem 1200 ..... $299
49576 Smartmodem 2400 ..... $349
49578 Smartmodem 9600 ..... $899
**Shiva**
22507 NetModem V2400 ..... $435
22528 NetModem V.32 9600 ..... $1,289

### Communications - Network

**Adaptec**
22500 Nodem Thick ..... $395
22527 Nodem Thin ..... $395
**Asanté**
22525 MacCon+ SEE ..... $295
22526 MacCon+ SE30E ..... $395
22529 MacCon+ IIET ..... $395
22531 MacCon+ SE30ET ..... $395
22532 MacCon+ SEET ..... $292
22538 MacCon+ IIE ..... $395
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22513 PhoneNET Din-8 ..... $31
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22519 Portable Pack ..... $329
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22509 Interbridge ..... $645
**Interex**
26295 SCSI Terminator, 50-Pin M/F ... $18
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22510 FastPath 4 Gateway ..... $1,935
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22506 TeleBridge ..... $339
**Shiva**
22508 Ethergate ..... $1,825

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23543 IIci 8-Bit 640x480 ..... $345
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22007 GS30 Grey Scale 19" Mon. . $1,614
23531 Color Board 264 ..... $554
23538 Color Board 208 ..... $344
23539 Color Board 264/SE-30 ..... $690
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22002 14" Color Monitor w/o card ..... $595
**Seiko/Rasterops**
22001 14" Monitor w/Color Bd. 264 $1,119
22005 14" Monitor w /Color Bd. 208 . $909
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22008 L-View Multi. w/card ..... $1,495
22000 19" Colormax w/card ..... $4,999
22100 PageView 15" Mac II ..... $1,050
22101 PageView 15" . SE ..... $999
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22103 SilverView 21" . SE/30 ..... $1,599

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22107 SilverView 21" SE ..... $1,599

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23733 DigiVideo B/W Card ..... $399
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23639 Acc. 030 50mhz II ..... $2,309
23644 Acc. 030 25mhz IIx ..... $1,149

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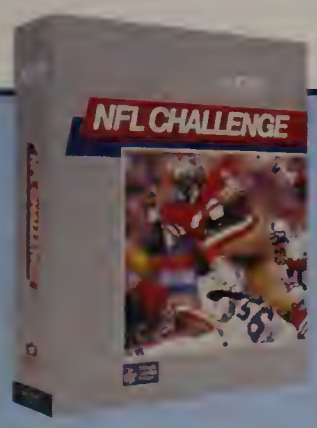


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28606 Tetris ..... $18
28610 PT-109 ..... $25
28614 Falcon 2.2 ..... $30
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28616 Sargon IV ..... $29
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29206 ClarisCAD 1.0 ..... $578
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29234 Cricket Draw ..... $173
**Deneba Software**
29232 Canvas ..... $186
**Innovative Data Design**
29238 Dreams 1.1 ..... $315
29241 MacDraft ..... $192
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29222 SuperPaint ..... $129

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29202 MacPaint II 2.0 ..... $94
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29236 Cricket Paint ..... $176
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29230 PixelPaint Pro ..... $387
29228 PixelPaint ..... $223

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29242 Studio/1 ..... $95
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29212 Videoworks II Accelerator ..... $119
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29218 Model Shop ..... $378
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27592 Turbo Pascal ..... $67
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27590 QuickBasic ..... $64

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The **SWITCHBOARD** from DataDesk is the first fully customizeable keyboard. Remove the keypad and cursor key modules and re-arrange them in the position that works best for you. Add the optional **SWITCHBALL** to maximize your input.

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29217 Director ..... $436
29258 Accelerator ..... $124
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29798 PowerPoint 2.01 ..... $246

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**Springboard**
29808 Certificate Maker ..... $21
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29812 Top Honors ..... $57

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**Letraset**
29794 LetraStudio ..... $273
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30380 SmartScrap & Clipper ..... $45

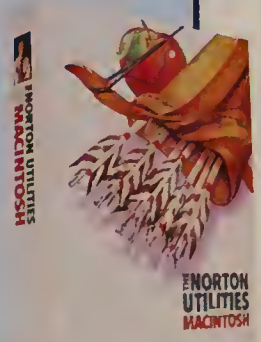
### Graphic Art Collections

**Adobe**
29246 Smart Art 1 ..... $83
29248 Smart Art 2 ..... $83
29250 Smart Art 3 ..... $91
**T/Maker**
29252 Click Art Business ..... $32
29254 Click Art Holidays ..... $32
29256 Click Art Christian ..... $37
29816 EPS Illustrations ..... $83
29818 EPS Business Art ..... $82

### Optical Character Recognition

**Caere**
30610 OmniPage 2.0 ..... $535

## Norton Utilities Take Care of Business




With Norton Utilities for the Macintosh, you can recover a lost file or repair a disk problem. Fast. A comprehensive and useful set of utilities at a great price. Best of all, you won't spend a lot of time figuring out complicated programming.

Norton Utilities for the Macintosh
(Symantec) 30436 ..... $79

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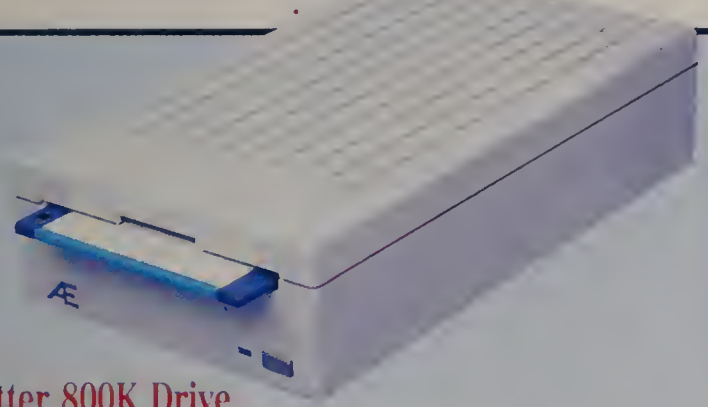
27581 Supercard 1.5 ..... $197
**Smethers Barnes**
27588 Prototyper ..... $183
**Symantec**
27582 Just Enough Pascal ..... $46
27584 THINK Pascal v3.0 ..... $160
27586 THINK C ..... $163



## A Better 800K Drive

Applied Engineering makes the 3.5-inch floppy drive even more useful with features like a read/write indicator light and an auto-eject button (no more paper clip ejectors). The 800KB floppy drive is upgradeable to the 1.44MB capacity.

**AE 800KB 3.5-inch Floppy Drive 24735 ..... $205**
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### Data Organization

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**Fifth Generation**
30402 Suitcase II ..... $47

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# We've Added More Than 500 Products

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23646 Acc. 030 40mhz IIx ..... $1,699
23643 Acc. 030 50mhz IIx ..... $2,309
23640 Acc. 030 25mhz IIcx ..... $1,149
23641 Acc. 030 33mhz IIcx ..... $1,539
23642 Acc. 030 40mhz IIcx ..... $1,699
23647 Acc. 030 50mhz IIcx ..... $2,309
23634 Acc. IIci CACHE Card ..... $754

**Dove**
23636 Acc. Dove 33MHz SE-30 board $499
23637 Acc. Dove SE 020 w/881 & 1MB $799

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**Technology Works**
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25481 4 X 4MB SIMMS (80ns) ..... $1,399
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25483 4 X 1MB SIMMS NTX ..... $276
25484 4 X 1MB SIMMS FX ..... $276

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25282 Cordless Mouse ..... $89

**American Power**
26292 UPS IIOSE ..... $207
26294 UPS 370ci ..... $337

**DataDesk**
25180 Mac-101 Keyboard, ADB ..... $134
25181 Mac-101 Keyboard ..... $134
25182 SWITCHBOARD ..... $174
25183 SWITCHBALL ..... $115
25184 15 function key module ..... $37

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25281 Turbo Mouse ADB ..... $107
26888 System Saver Mac+ (beige) .... $62
26907 System Saver Mac+ (platinum) $62
26889 System Saver Mac SE ..... $62

### Get on the (Mouse)Stick

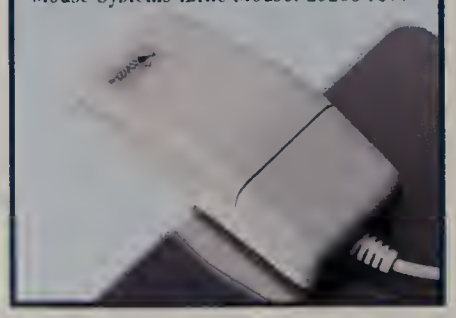
Add an **Advanced Gravis Mousestick** to your system and you'll have pixel-by-pixel precision for CAD or desktop publishing projects as well as for games. Three programmable buttons and 16-character display give you added input options.

**Advanced Gravis ADB**
Mousestick 25286 ..... $66

### The Smaller Mouse

Smaller is better with the **Little Mouse.** This electronic mouse is 22% smaller than the average mouse, offers 50% higher resolution — up to 300 counts per inch — and uses 100% optical technology. Optical mouse pad included.

**Mouse Systems Little Mouse.** 25283 . $77



**Mouse Systems**
25283 Little Mouse ..... $77
25284 Trackball ADB ..... $72

**Summagraphics**
26885 Bit Pad Plus ..... $318

## Accessories

41601 Teak 3.5" Double Rolltop Box ..... $29
41600 Teak 3.5" Single Diskette Box $17.99
41026 Vacuum w/hose ..... $45
41035 Datavac Bags (5pk) ..... $2.95

**Bernoulli**
57804 Tape Cartridge 44MB ..... $95

**CompuAdd**
4[illegible]9 Kleen Keyboard Kit ..... $8.98
4[illegible]31 Eleven Piece Tool Kit ..... $11.95
4[illegible]52 Teak KB Drawer PSK 132 ..... $69
4[illegible]3 Under-Desk Keyboard drawer . $19

**Cover-up**
26894 Mac Plus/SE Dust Cover ..... $8
26895 Imagewriter II Dust Cover ..... $8

**Kensington**
25580 Mac II Monitor Stand ..... $62
25582 Tilt/Swivel Stand ..... $23
26882 SE Anti-Glare Filter (beige) ..... $32
26883 SE Anti-Glare Filter (platinum) . $32
26884 Security Kit ..... $33
26887 Mac II System Stand ..... $20
26891 Apple RGB Anti-Glare Filter ..... $62
26892 Mac II Stand & Cable Kit ..... $63
26893 Masterpiece Mac II ..... $103
26896 Universal Printer Stand ..... $15
26897 LaserWriter II Dust Cover ..... $12

**Pace**
26898 MacAvenue SE Carrying Case $65
26901 MacAvenue SE Carrying Case w/ Ext. Kbd. ..... $76

**Sony**
57440 3.5" Diskettes 1.44MB 10Pk $24.29
57401 3.5" Disketted 800K 10Pk ... $13.95

## Sound Interfaces

**Farallon**
23730 MacRecorder ..... $158

**Passport Designs**
23732 MIDI Interface ..... $76

# Software

## Writing & Publishing

### Word Processing Writing

**Ashton-Tate**
30600 FullWrite Prof. ..... $253

**Claris**
30586 MacWrite II 1.1 ..... $157

**Microsoft**
30580 Microsoft Works ..... $177
30582 Microsoft Word ..... $245
30584 Microsoft Write ..... $77

**Paragon Concepts**
30602 Nisus ..... $236

**T/Maker**
30588 WriteNow ..... $124

**WordPerfect**
30590 WordPerfect Mac 1.05 ..... $229

### Page Layout Publishing

**Aldus**
29781 Pagemaker 4.0 ..... $497

**Letraset**
29792 Letraset Ready-Set-Go ..... $273

**Silicon Beach**
29796 Silicon Press ..... $51

**Springboard**
29814 Springboard Publisher ..... $107

**Timeworks**
29822 Publish-it ..... $223

### Utilities for Writers/Publishers

**Aldus**
29786 PageMaker Color Ext. ..... $133

**Deneba Software**
30618 Big Thesaurus 1.0 ..... $63

**ICOM Simulations**
29820 MacKern ..... $113

**Microlytics**
30622 WordFinder 2.0 ..... $34

**Power Up**
30440 Letter Writer Plus ..... $54

**Symantec**
30605 More II 2.01 ..... $265

**Symmetry**
30606 Acta Advantage ..... $63

**Working Software**
30594 Findswell ..... $35
30598 QuickLetter ..... $72

### Spelling Checkers

**Deneba Software**
30620 Spelling Coach Pro 3.1 ..... $123

**Working Software**
30596 Spellswell ..... $46

### Fonts & Font Utilities

**Adobe**
Adobe Fonts All 134 available ..... CALL
29825 Type Manager 2.0 ..... $57
29826 TypeAlign ..... $58
29828 Type Mgr/Type Align ..... $88
29830 Type Reunion ..... $38

**Custom Applications**
30444 Freedom of Press ..... $255

## Business Software

### Integrated & Bundled Applications

**Microsoft**
30182 Microsoft Office Bundle ..... $525
30580 Microsoft Works ..... $177

### Accounting/Bookkeeping

**Aatrix**
28468 Checkwriter II ..... $37

**DAC**
28474 Easy-Light / Mac ..... $41

**Intuit**
28458 Quicken ..... $39

**Layered**
28440 Insight Accounts Payable ..... $395
28442 Insight Accounts Receivable .. $395
28444 Insight General Ledger ..... $395
28446 Insight Inventory ..... $395
28448 Insight Payroll ..... $395
28450 Insight Time Bill ..... $395
28454 Insight At Once ..... $283

**Meca**
28463 Managing Your Money ..... $139

**Monogram**
28464 Dollars & Sense ..... $78
28466 Business Sense 1.2 ..... $265

### Create a Diskette Library

Organize up to 80 3.5-inch diskettes in **The Library**, a carrousel-mounted storage system that adds a useful index on each side. Stack several units and you'll have a desktop diskette warehouse.

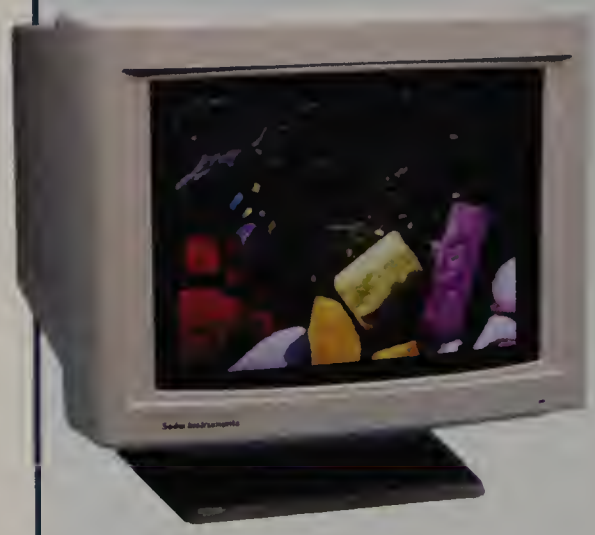
**The Library** (Innovative Technologies).
Gray 26903 ..... $12
Black 26905 ..... $12

**Softsync**
28481 Accountant Inc. Prof ..... $368

**Survivor Software**
28478 MacMoney 3.5 ..... $58

### Data Analysis & Presentation

**Abacus Concepts**
28470 StatView II (Mac+,SE, II) 1.03 $278
28472 StatView SE + Graphics 1.03 . $199



### Enjoy a Brighter Color Image

Display your graphics in unbelievable color with the **Seiko 14-inch color monitor.** The Seiko 1445 uses Sony Trinitron technology to create color images that are 43% brighter than is possible with the Apple color monitor.

**14" Seiko color monitor** (without card) 22002 ..... $595
with RasterOps Color Board 208 22005 ..... $909

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**Technology Works 2 x 1MB SIMM Kit —80ns 25480 ..... $120**

## Database

**Acius**
27780 4th Dimension 2.1 ..... $511
27783 4th Dimension Runtime 2.1 ..... $85
**Claris**
27789 Claris Filemaker Pro ..... $216
**Fox Software**
27790 FoxBase II 2.0 ..... $292
27792 FoxBase II Runtime 2.0 ..... $176
27794 FoxBase Multiuser 2.0 ..... $385
27796 FoxBase Mltuser Runtime 2.0 $293

**Excellent Spreadsheets**

Almost 90% of Mac spreadsheets are created in **Microsoft Excel**, so you probably know about the program's powerful features. Excel is the most full-featured top-of-the-line spreadsheet. And **Desktop Help for Excel** gives you the information you need to master all Excel functions, including macros.

**Microsoft Excel 2.2** 30180 ..... $245
**Desktop Help For Excel**
(Help Software) 28038 ..... $48

**Microsoft**
27798 Microsoft File 2.0 ..... $123
27804 Double Helix 3.0 ..... $339
**ProVue**
27808 Panorama ..... $246

## Time & Project Scheduling

**AEC**
29744 Fast Track Schedule ..... $108
**Claris**
29740 MacProject II 1.1 ..... $366
**Symmetry**
27810 KeyPlan 1.0 ..... $290

## Office Productivity Programs & Utilities

**CE Software**
30358 Calender Maker v3 ..... $30
**Claris**
29200 Smartforms Designer ..... $291
**Kiwi Software**
30372 Kiwi Envelopes v3 ..... $34
**MySoftware**
27816 My Advanced MailList ..... $27
**Odesta**
27818 Data Desk 3.0 ..... $347
**Paracomp**
27806 Milo 1.0 ..... $156
**Power Up**
30432 Calender Creater + Mac ..... $41
30440 Letter Writer Plus ..... $54
30438 Fast Forms 2.0 ..... $116
30442 Address Book Plus ..... $52
**Satori Software**
27812 BulkMailer 3.3 ..... $76
27814 BulkMailer Plus 3.25 ..... $187

## Spreadsheet Programs & Templates

**Ashton-Tate**
30187 Full Impact 2.0 ..... $245
**Individual Software**
28476 101 Macros for Excel ..... $35
**Informix**
30184 Wingz 1.1 ..... $245
**Microsoft**
30180 Excel 2.2 ..... $245
30580 Microsoft Works 2 ..... $177

## Communications

### On the Modem

**CompuServe**
27702 CompuServe Info Serv ..... $23
27705 CompuServe Navigator 3.0 ..... $49
**Connec**
27706 Connect v. 1.5 ..... $93
**Dow Jones**
27670 News/Retneval Membership ..... $23
27672 Desktop Express ..... $94
**Farallon**
27668 Timbuktu Remote 1.01 ..... $123
**Freesoft**
27664 White Knight II ..... $89

**Hayes**
27662 SmartCom II 3.1 ..... $84
**Microcom**
27708 Carbon Copy Mac ..... $119
**Microsoft**
30580 Microsoft Works ..... $177
**Software Ventures**
27660 Microphone II 3.0 ..... $213
**Traveling Software**
27710 LapLink Connectivity ..... $119

### On the Network

**CE Software**
27695 Quickmail 5 User v2.2 ..... $210
27696 Quickmail 10 Pack 2.2 ..... $313
27698 In/Out 5 User ..... $125
27700 In/Out 10 User ..... $187
**Farallon**
27666 Timbuktu 3.0 ..... $95
27674 TrafficWatch 1.08 ..... $127
**Microsoft**
27676 MS Mail Workstation ..... $83
27678 MS Mail Server ..... $246
27680 MS Mail 20 Pack 2.0 ..... $959
**Tops**
27683 Tops Network Bundle/Mac ..... $187
27685 Tops Network Bundle/DOS ..... $159
27686 NetPrint v. 2.0 ..... $115
27688 InBox Starter 2.2 ..... $143
27690 InBox Connection 2.2 ..... $41

## Education & Entertainment

### On the Learning Curve

**Broderbund Software**
27958 Type! 1.0 ..... $18
27962 Geometry 1.2 ..... $57
27964 Calculus 1.2 ..... $57
27966 Physics 1.2 ..... $57
**Byte**
27974 Puzzle Storybook ..... $26
27976 Dinosaur Discovery Kit ..... $26
27982 First Shape ..... $31
27984 Speller Bee ..... $31
**Carina Software**
28004 Voyager ..... $87
**Davidson & Associates**
27970 Math Blaster Mystery ..... $27
27968 Math Blaster! 1.0 ..... $29
27972 Speed Reader II ..... $29
**Great Wave**
27986 TimeMasters ..... $21
27988 KidsTime 1.2 ..... $24
27990 KidsMath 1.1 ..... $25
27992 NumberMaze 1.1 ..... $25

**Tax Help From MacInTax**

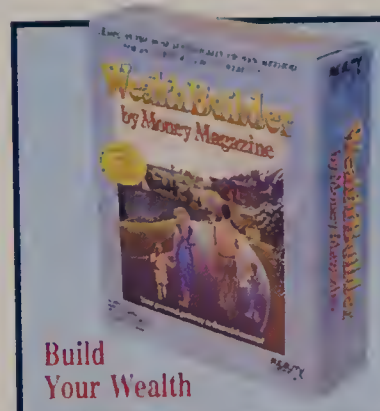
**MacInTax** automatically calculates tax figures and checks your IRS forms for errors and inconsistencies. Includes special worksheets for itemizing deductions and organizing tax data.

**MacInTax.** 28502 ..... $61

**ILearning Company**
28000 Reader Rabbit 2.2 ..... $31
28002 Talking Math Rabbit ..... $31
**Simon & Schuster**
28008 Typing Tutor ..... $28
**Springboard**
27948 Animal Kingdom ..... $26
27950 Math Wizard ..... $26
27952 MacRobots ..... $26
27954 Read-A-Rama ..... $31

### Just for the Fun of It

**Accolade**
28688 Hardball ..... $25
28690 Mean 18 ..... $25
28692 4th and Inches ..... $26
**Activision**
28696 Manhole ..... $28
28698 Manhole (CD ROM) ..... $34
28700 Cosmic Osmo ..... $40

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**WealthBuilder** by *Money* magazine will guide you through the stormy waters of financial planning and give you advice on investing, saving and strategic planning. You just ask questions, **WealthBuilder** has all the answers.

**WealthBuilder** by Money magazine (Reality Software) 28496 ..... $164

**Broderbund**
28664 Star Wars ..... $23
28666 Shufflepuck Cafe ..... $22
28668 Ancient Art of War ..... $25
28670 Ancient Art of War at Sea ..... $25
28672 Where/Carmen Sandiego ..... $28
28674 Where/Europe Carmen ..... $28
28676 Where/USA Carmen ..... $28
28678 SimCity ..... $28
28680 SimCity Supreme ..... $47
**Bullseye**
28682 Fokker Tri-plane ..... $23
28686 P51 Mustang Flight Simulator ..... $32
**Casady & Greene**
28705 Crystal Quest 2.2T ..... $39
28706 Crystal Quest 2.2T w/edit ..... $39
**Electronic Arts**
28652 Reach for the Stars ..... $25
28654 Bard's Tale ..... $30
28656 Chuck Yeager Flight Sm ..... $30
28658 Life & Death ..... $31
28662 Starfleet ..... $35
**In-Line Design**
28738 Bomber ..... $25
**Mindscape**
28632 Balance of Power 1990 ..... $31
28634 Colony ..... $28
28636 Deja Vu II ..... $30
28642 Gauntlet ..... $28
**PCAI**
28708 MacGolf ..... $33
**Sierra-On Line**
28710 SpaceQuest ..... $28
28712 SpaceQuest II ..... $28

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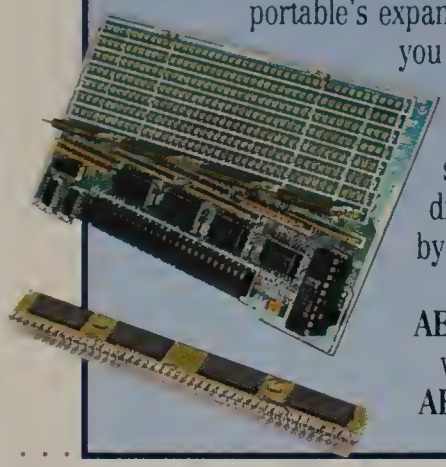
Applied Engineering's products enhance your Mac. The **Portable RAM** upgrade card operates well within the power budget for the portable's expansion slot, so you get more processing power with-out draining your battery. The **Quadralink** gives you four additional serial ports. Includes a "shadow driver" so the ports will be recognized by all versions of software.



**AE Mac Portable Memory Card**
w/1MB 25487 ..... $535
**AE Quadralink** 26917 ..... $205

**On Technologies**
30434 On Location ..... $75

### Data Storage Management & Repair

**1st Aid Software**
30420 Complete Undelete ..... $36
**ALSOFT**
30422 DiskExpress II 2.04 ..... $54
**Central Point**
30362 Copy II Mac ..... $24
30365 Mac Tools Deluxe ..... $79
**Dantz Development**
30384 Retrospect ..... $152
**Electronic Arts**
30410 Disk Tools Plus ..... $31
**Fifth Generation**
30404 FastBack ..... $106
**Microseeds Publishing**
30375 INITPicker ..... $39
30378 Redux ..... $51
**Norton Utilities**
30436 Norton Util/Mac ..... $79
**SuperMac Software**
30392 DiskFit ..... $58
30394 Network DiskFit ..... $223
**Symantec**
30340 Sum II ..... $92
**xTree**
30344 xTree Mac ..... $52

### Shortcut & Time Saving Utilities

**Abbott Systems**
30348 CanOpener ..... $63
**Affinity Microsystems**
30352 Tempo II ..... $97
**CE Software**
30356 QuickKeys ..... $62
30360 MockPackage Plus Util. ..... $30
**Fifth Generation**
30400 PowerStation ..... $33
**Icom Simulations**
30408 On Cue ..... $36
**Insight Development**
30428 MacPnnt 1.2 ..... $94
**Olduvai**
30430 Clip Share 1.0 ..... $138
**Solutions Int'l**
30382 SuperGlue ..... $61
**SuperMac**
30386 SuperSpool ..... $58
30388 LaserSpool ..... $92
30390 LaserSpool 5-Pack ..... $286

### Data Security Utilities

**Fifth Generation**
30406 DiskLock ..... $106
**Kent marsh LTD**
30366 QuickLock v1.0 ..... $55
30368 The Night Watch v1.03 ..... $85
30370 MacSafe II ..... $105
**Supermac**
30396 Sentinal ..... $86

### Screen Saver Utilities

**Berkley Systems**
30425 After Dark ..... $24
**Fifth Generation**
30399 Pyro ..... $21

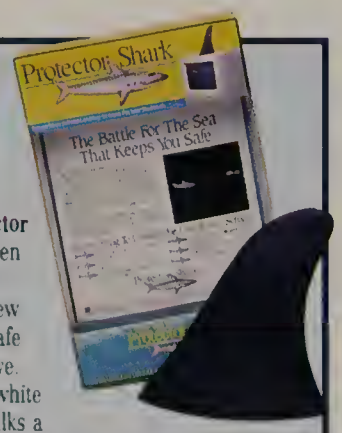
### Virus Detectors & Eradicators

**HJC Software**
30413 Virex ..... $51
30414 Virex (10 Pack) ..... $346
**Symantec**
30342 SAM ..... $63

### Other Utilities

**Affinity Microsystems**
30350 Affinifile ..... $44
**Microseeds Publishing**
30376 Screen Gems ..... $39

### Sharks Protect Your Screen




The **Protector Shark** screen saver gives sharks a new image — safe and effective. The great white menace stalks a diver as it prevents screen phosphor burn-in. If you have a minute, play a "sea-hunt" game — shoot the shark before it eats you.

**Protector Shark**
(Ibis Software) 30538 ..... $34

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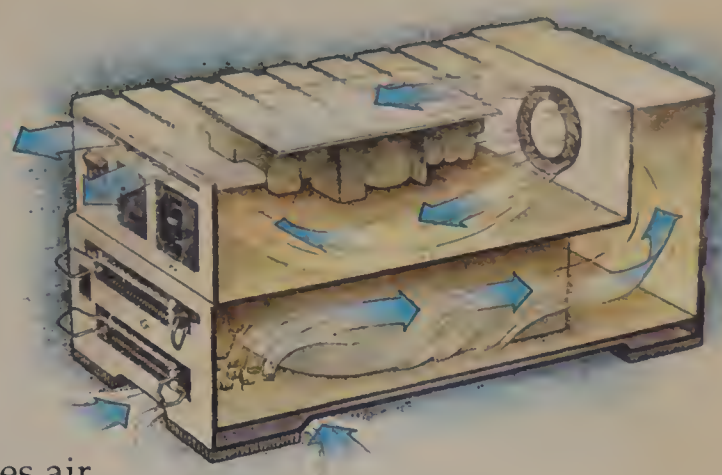

*It's Really Cool*

An external hard drive that keeps its cool also keeps its reliability. The Protegé is a really cool machine because it maximizes air flow across its drive assembly and its isolated power supply — efficiently cutting the danger of heat-related failure from the two most important parts of your drive.

*Big Power, Little Package*

The sleek little Protegé proves big capacity doesn't mean big deskspace. It's one of the smallest drives on the market, more like a palmprint than a footprint.

*Solid Protection*

A tight, interior metal chassis makes the Protegé more solid than the competition, so you get less noise and more stability and safety. In fact, this tough little drive may well be the best shielded piece of equipment on your desk.

## *Exclusive!*

**You'll Never Lose A File**

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*A $129.95 value.*

## *Drive Your Bargain*

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**Protegé Hard Drives**

| Capacity | External | | Internal | |
|---|---|---|---|---|
| | Seagate | Quantum | Seagate | Quantum |
| 20+MB | $345 | n/a | $295 | n/a |
| 40+MB | $395 | $455 | $325 | $375 |
| 80+MB | $525 | $645 | $465 | $595 |
| 100+MB | $649 | $695 | $575 | $645 |

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ics accelerators? Competition. Next is challenging Apple head-on with the introduction of its high-resolution accelerated 32-bit graphics board. In addition, the technology developed by third-party companies for the Macintosh is moving over to the IBM world. By sometime next year, Apple could find that it no longer has the edge in display technology—that better, faster video boards are available for Next systems, IBM PCs, and PC compatibles. That development, combined with Windows 3.0 (or 3.1, or whatever version is currently shipping) could lead to Apple's losing the desktop-publishing–graphics-design market that has sustained the company for so long.

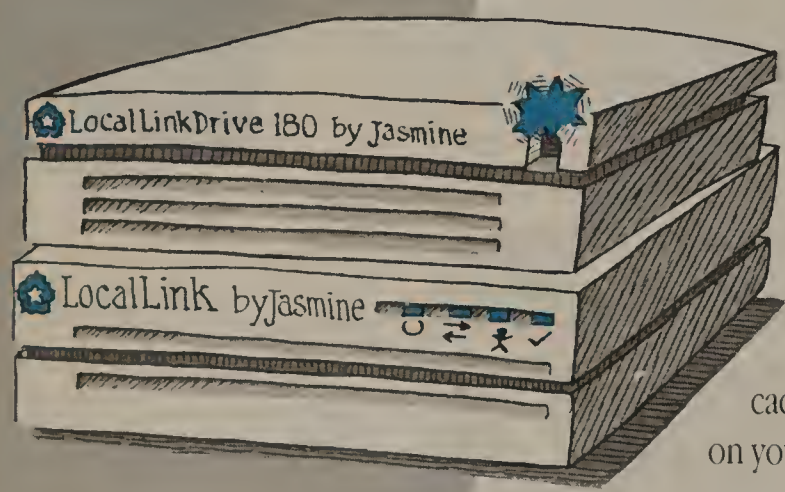
Developers I spoke to had three requests. First, Apple should make QuickDraw an open system. At the very least, Apple should publish the public data structures used by QuickDraw routines and interfaces for the lower-level functions in QuickDraw. This would make it much easier for third-party accelerator developers to boost QuickDraw performance. Second, Apple should remove the hardware roadblocks in current Mac architecture. This would include supporting block transfer between main memory and NuBus boards, implementing the NuBus'90 specification, and making hardware color compression/decompression a standard part of system architecture. Finally, Apple needs to share its vision with developers. A year from now, clever commercials about superior displays and ease of use may be coming from IBM and Microsoft, not from Apple. A nice graphical user interface is no longer enough to sell Macs, and it's not clear what more Apple has to offer.

What does this all mean for users? In the short term, we'll see the major players—Apple, Radius, RasterOps, and SuperMac—moving toward common functionality and approach.Competition for a limited installed base of Macs-with-slots will force prices down (good news for us, bad news for these companies); it will also entice—is enticing—these same firms to go after the IBM market (good news for them, bad news for Apple). In short, late 1991 will probably see a de facto standardization of 24-bit accelerated video boards, with most differences being based on marketing emphasis rather than actual technology.

How, then, do you choose a particular solution, especially while the market has not yet converged? By two factors: cost (can you afford it? can you afford not to have it?) and functionality (does it speed up the applications you use most often? by how much?). To be honest, unless you have a compelling need for 24-bit color, then there isn't much point in worrying about an accelerator right now. ■

*Contributing editor Bruce F. Webster is vice president of R&D at San Diego–based Pages, Inc. He can be reached via BIX (bwebster) and via MCI Mail (Bruce Webster).*


# Filesharing Just Became Easier.

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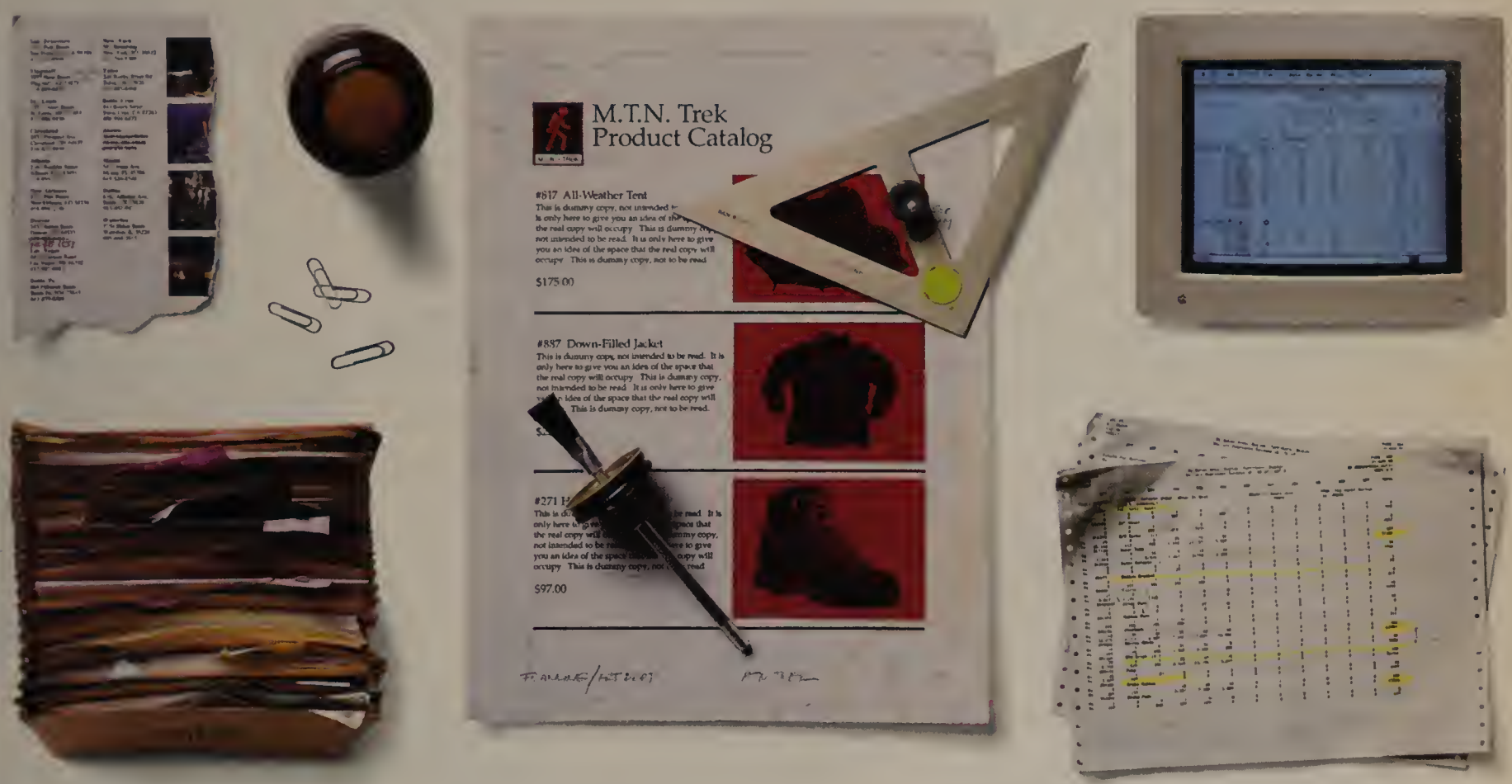
Circle 369 on reader service card.

# You can't always choose the data you have to manage.




# But you can choose how to manage it.

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Which is why so many people are turning to FileMaker® Pro software.

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But why not see it for yourself? Just stop by an authorized Claris® dealer and ask to see FileMaker Pro.

**FileMaker Pro.**
**The #1 database manager for the Macintosh.**

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**Circle 227 on reader service card**

# PostScript Power To The People!

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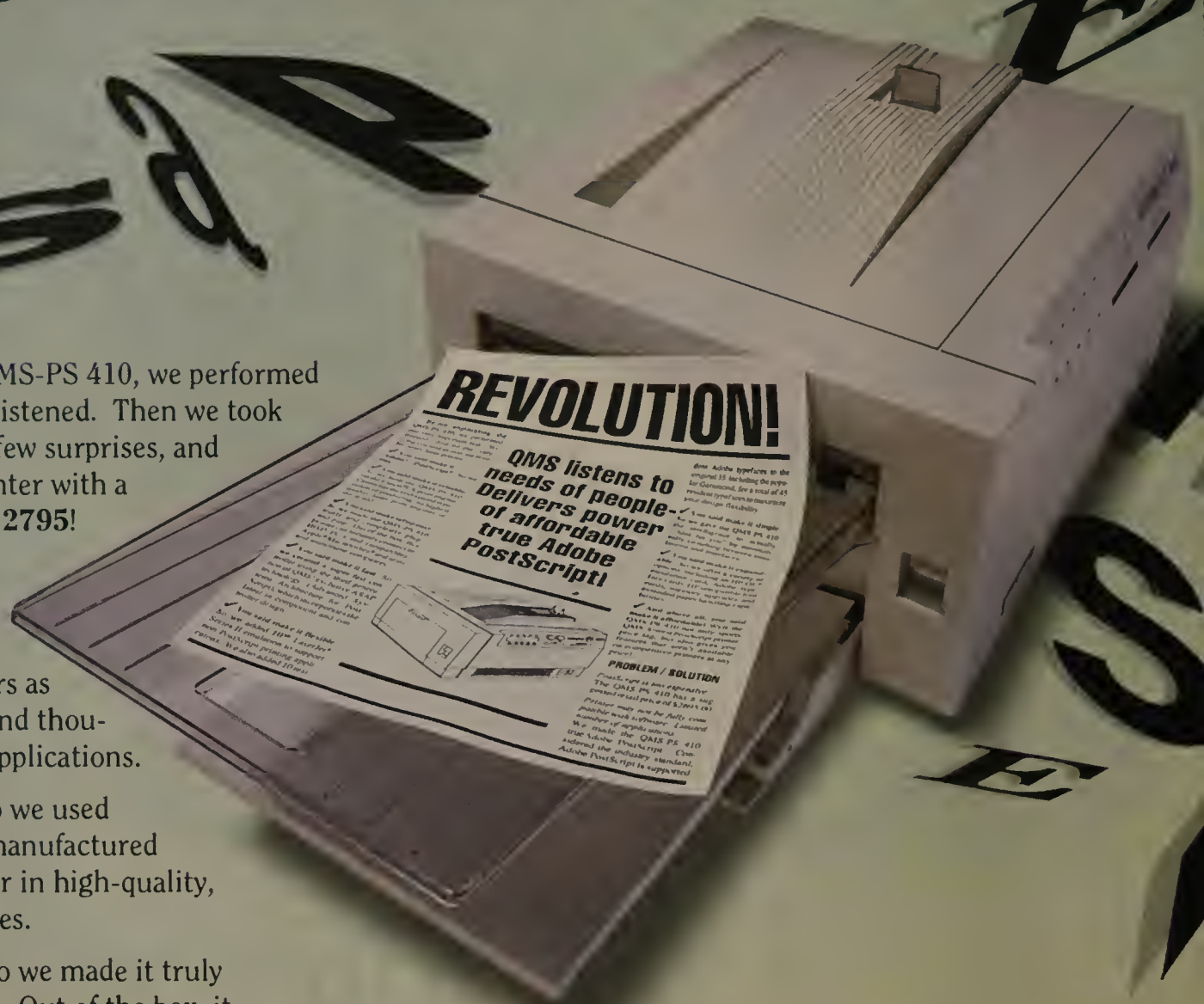


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**You said make it Adobe® PostScript®.** So we did. And now you can enjoy the design flexibility only PostScript offers as well as 45 resident typefaces and thousands of PostScript software applications.

**You said make it reliable.** So we used the Canon® LX print engine manufactured by the undisputed world leader in high-quality, easy-maintenance print engines.

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# Verbatim

## An interview with Sue Morgan, founder of SoftView

BY JERRY BORRELL

*Sue Morgan, who grew up in Los Angeles, studied physics and mathematics at the University of California, Berkeley. For several years she worked part-time doing contract programming at Lawrence Berkeley Laboratory. After a seven-year digression from studies working as a photographer, she returned to UCLA and obtained a B.A. in quantitative psychology in 1975, as well as an M.A. in cognitive psychology in 1977. She completed course work for her doctorate before deciding not to pursue psychology as a career. In 1984 she founded Softweave with her programmer husband, Mike Morgan. That company became SoftView, which now has $6.1 million in annual revenues, employs 65 people, and dominates the tax software market for the Macintosh.*

**MW** How did you become interested in computers?

**MORGAN** I started to learn programming in FORTRAN on minicomputers when I worked at the Lawrence labs. Later, at UCLA, I did programming on the minis at the psych lab.

**MW** What happened to your interest in psychology?

**MORGAN** While working on my dissertation I became addicted to skydiving. I started to work at the drop zones, doing work on other projects, and not focusing on my dissertation. I even started a skydiving club at UCLA.

Although I decided I really wasn't into psychology, I loved programming. So I got a job programming at Technology Service Company (TSC) in Santa Monica [California] doing man-machine interface work on a navigational training system that included weapons delivery and navigational training.

During my two years at TSC I met my husband, who was the leader of the project I was working on.

**MW** What came next?

**MORGAN** After finishing my task at TSC, I got a job with SDC/Burroughs in Camarillo [California] as the leader of the in-house group for testing a product called OfisFile, a large file search and retrieval system. The project experienced cost problems, though. So after one year I transferred to a project being done for the Point Mugu Naval Air Station.

**MW** When did you first become interested in personal computers?

**MORGAN** I was on pregnancy leave from SDC and they had mistaken my benefits so that I had two checks coming in. At one point I noticed an extra $4000 in the bank. So in May of 1984 we looked at one another and said, "Let's buy a computer." We considered an IBM PC AT and this new machine called a Mac.

The IBM had color but the Macintosh had the advantage in terms of user interface and graphics capability. We decided that color wasn't important. The 128K of memory was a problem, but Apple had announced a 512K upgrade, so we decided to buy a 128K Mac bundled with MacDraw and MacWrite. It was the typical love affair. Oh yes, we eventually paid SDC back.

**MW** What made you decide to start a Mac company?

**MORGAN** We started generating a list of Mac ideas. After about two months Mike thought of a program we could do. He thought we could write an income tax program for the Mac—replicating the tax form on screen with the Mac's graphics and getting the IRS to approve the printout.

We looked at all the computer magazines for tax programs. But there was nothing like what we were con-

*(continues)*

PHOTOGRAPHS BY CYNTHIA MOORE

sidering because even on the IBM PC there was no concept of graphics on the screen. We divided up the work. Mike would do the programming and tech work, while I would handle the database [instructions], raise money, and be in charge of getting the product boxed and sold.

**MW** Did you go to Apple and tell them about your plans?

**MORGAN** We never thought about going to Apple because we didn't know they helped developers. We didn't know that evangelism even existed. I didn't find out about Apple developer support until later.

The guy at our computer store told us that if we wanted to develop a program for the Mac we would have to get *Inside Macintosh*. We also found out that we needed a Lisa, the development environment for the Mac. And so we bought a Lisa through a dealer at full retail [price] on a credit card. Mike worked on the program on weekends and in the evenings.

**MW** Developing a product didn't appear to be so easy?

**MORGAN** I panicked. We also needed the software supplement to *Inside Macintosh* and I found out that you had to get it from Apple and that they didn't release it to just anyone. We drove to Cupertino and I knocked on the front door at Apple. I told Apple that we were developing a product. They finally sent someone out who asked us what the name of our company was. I told her we didn't have one yet. The woman asked about our business plan and I said we didn't have one. So she had me write down on a sheet of yellow paper that we were doing a tax program and then she gave me the software supplement.

**MW** At what point did you initiate a relationship with Apple?

**MORGAN** I found out by talking to developers that you were supposed to have an evangelist and talk to people at Apple. I met Tom Nalevanko of Mainstay, another developer in Los Angeles. He invested in SoftView as a limited partner. I got to know people like Mark Marlow, from Ann Arbor Software.

Then I started making trips to Apple. I talked to Alain Rossman first. He said our product was great and tried to help us by letting the field sales group know how to use the product. I was never able to work out a formal agreement with Apple, though.

**MW** When did you begin development in earnest?

**MORGAN** Mike took a leave of absence from Northrop [Industries] in September of 1984 in order to finish the program in two months. Instead it took six months. The program was finished by February 1985 on the 512K, but it took us two more months to fit into 128K since we wanted to support all of the machines sold to date.

*I believe what Dave Winer always said: Claris is Apple. Say that 100 times until you get it straight in your head.*

With no idea what to charge, we released the program at $79 in April of 1985. We did have the concept of updates for registered users at half price, though. We took out an ad in *Macworld* and it got a lot of attention.

**MW** How did you get approval from the IRS and know that your computer-generated forms would be accepted?

**MORGAN** Everyone knew that the IRS did not accept computer-generated 1040s. But Mike looked at the specifications and decided that meant they wouldn't accept forms generated by *character-based* computers and printers. They were accepting output from thousand-dollar programs printed by lasers. CPAs told us we were crazy, that no dot matrix–printed forms would be acceptable.

I talked to the guy at the IRS whose department approved forms. He told me that to be a legal document the 1040 form had to have the graphics of the IRS form. We accomplished that with an ImageWriter and got our form approved for MacInTax for the 1984 tax year. CPAs said they didn't believe us. I had to send them a copy of the IRS letter. I got smart the next year and printed the letter in the program's documentation. Two years later CPAs were still saying that the IRS wouldn't accept computer-generated 1040s.

**MW** So by May of 1985 you were on your way to fame and fortune?

**MORGAN** We had sold 500 copies and were running out of money. Mike had to quit work to finish the program. After talking to our accountant and to our lawyer, I had formed a company called Softweave. There was another California company with a similar name, and we used to get letters from customers with toilet-paper wrappers marked "Softweve" enclosed as a joke—so we changed our name to SoftView.

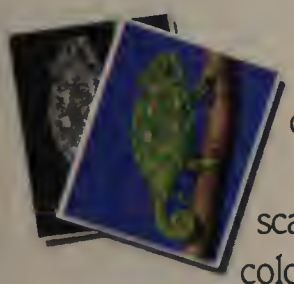
**MW** Given your limited resources, how did your company become known?

**MORGAN** Macintosh user groups were especially supportive. I went to all the large groups and demo'd MacInTax in San Diego, Berkeley, Sacramento. I remember the first big demo I did on a large screen in front of hundreds of people. The program came up from a video projector and filled the screen. And the crowd gasped in excitement.

I told people to see me about a limited opportunity to invest in our company after my demos. I reached the point where I was getting requests for 10 to 20 offering memorandums

*(continues)*

# Adapt to Changing Environments With Microtek's Color/Gray Scanner.



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**Circle 68 on reader service card**

at a time on how to invest in the company. There was a $6000 minimum investment, and I'd average one hit [one investor] from each group.

**MW** How did you run the company?

**MORGAN** I had a temporary service in 1984 that answered phone calls. They'd call me at work and I would return people's calls. I was lucky—since I had worked so much overtime for SDC, my boss was supportive. I did correspondence on the Mac. We effectively appeared to have an office, thanks to the address of the temporary service. We did our own disk duplicating, our own UPS shipping, and our own shrink-wrapping.

In June of 1985 we rented a one-room office and had one or two part-time secretaries. Mike was still our only programmer. There was not a lot to fund. My limited partnership brought in money. We went from one check to another until October.

**MW** What happened then?

**MORGAN** The same thing that happens every year: our update letter goes out. We let our registered customers know about the new features in the program and offer to take their orders. Many people send in their checks right away. October is just an incredible time, with checks pouring in.

**MW** How many registered users do you have now?

**MORGAN** Seventy to eighty thousand. We have a high rate of update. Word of mouth was very important in the beginning. And user groups are extremely important—if they like you. I remember the BMUG demo I did. They gave me a standing ovation, and the next day I had three or four calls from dealers and the press.

It was incredible back in those days [1985]. People would go to stores and ask for the "Mac tax thing." We had no distribution, no Apple help—just an enthusiastic following. Our installed base grew from 5000 in April of 1986 to 12,000 in 1987.

**MW** When did your first competitor appear?

**MORGAN** There was a tax program called TaxWizard around from the beginning, but it was very bad and we could take care of it. At the end of 1986 JK Lasser brought out a tax program. I knew Ingram, Micro D, and Softsel by then and was calling them about distribution. They told me that JK Lasser would go into their distribution channels. I said they'd get 100 percent return on the product [from dealers]. I asked if they had compared MacInTax to Lasser, but all they would say was that we were in trouble.

So we sold direct until the distributors finally picked up our product in 1987. We sent the product to the press, went to user groups, and

*(continues)*


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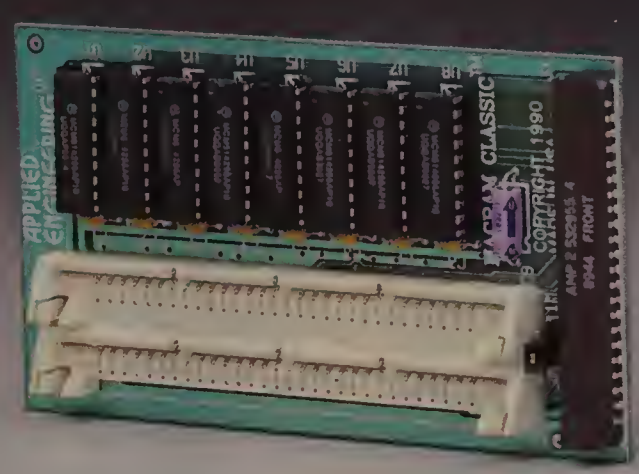


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This is the first printer to bring TrueImage technology to your desktop. Giving you absolute WYSIWYG fonts. With faster on-screen display. And faster printing.

TrueImage is the new printer standard. It contains TrueType, the same font technology that will go into every Macintosh running System 7.0 and IBM PC running Windows.

Which is why the world's leading font foundries are already designing with TrueType.

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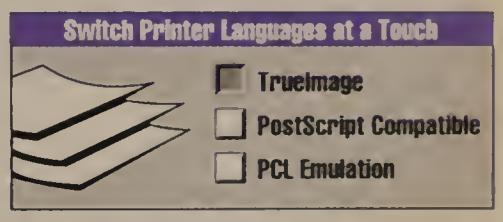


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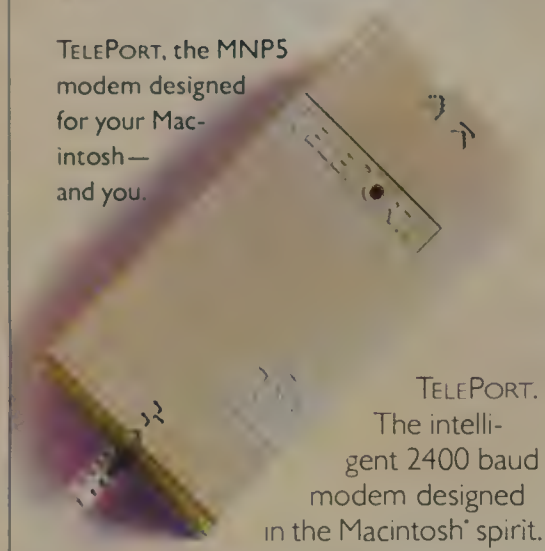

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people wrote about us. Once I got a call from field sales at Softsel—a guy asking why I wouldn't let Softsel distribute our program, that he had a hundred requests for it. I said that we'd tried but they'd turned us down.

You can't evaluate SoftView from the standard software company point of view. And when distributors try to determine what products to sell, they have you fill out forms asking, for example, how many times a year you'll advertise your product, in order to evaluate whether a company will support its products. But since we don't advertise more than six months of the year, filling out a form like this results in a clerk looking at it and saying that they can't carry your product. In a way you can't blame them; they have to consider thousands of products and they need some way to evaluate them all. All the major distributors turned us down in the beginning. I tease Bruce Fredrikson [VP of Ingram Micro D] about that whenever I see him.

**MW** How has your company come to dominate its market niche?

**MORGAN** MacInTax is more than a tax program. It is a technology that uses forms as an interface. It's wonderful for users. They can get online help and linking [data put in one place is automatically updated where it is needed in other places]. Mitch Kapor talks about those things in software that make a program a joy to use. Well, whatever that is, MacInTax has it. Mike developed the program as a tax program, but the underlying technology is a forms engine.

**MW** Your forms product was some two years late. Why?

**MORGAN** Because we invented something new. We call it "graphics intelligence." If you find that what you're doing is not the right thing, you have to start again. We did that two or three times. There is no other way to do it. if:x Forms Designer was finally released in June of 1990. (For a review of if:x Forms Designer, see *Reviews* in this issue.)

**MW** The forms market, ballyhooed by Claris and others as the second desktop publishing market, never happened. Why?

**MORGAN** I believe there's a market out there. But you have to give people a compelling reason to get away from designing things on paper and adopt the concept of having forms on a screen that are simple to communicate with and easy to fill out. But the reality is that the technology is not here yet. There is no way to exist in a paperless office. But there are products in development that will do some of that.

*Our issue with Apple is its inability to establish the Mac as viable for markets other than desktop publishing.*

**MW** What happened to the Claris and Adobe products?

**MORGAN** Instead of developing a technology to fit a need, Claris decided to take a technology it already had, add some tools, and go to market. In a sense, object-oriented drawing—the fundamental technology of most forms programs—looks like the right solution for the problem. After all, forms are lines, boxes, and words.

What's missing is that forms have a structure, that is, the relationship between lines and boxes. Words shouldn't overflow a box when you type something too long. Boxes shouldn't overlap. Applying object

*(continues)*

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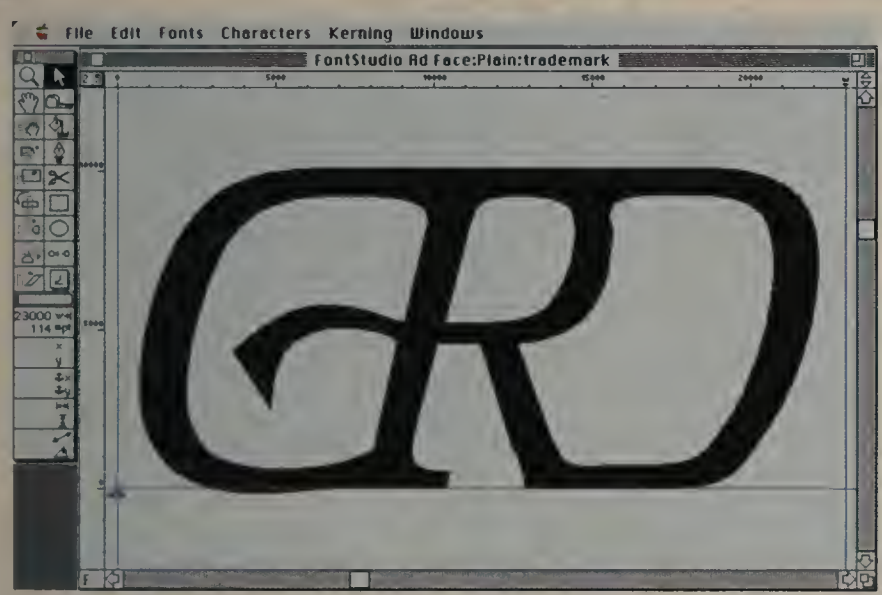

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orientation to forms leaves the user moving boxes around. There is no intelligence in the relationship between the objects on the form, so there's no reason for the user to leave paper.

**MW** How have Adobe and Claris fared in forms?

**MORGAN** Not well. We think Claris spent more than it made and no longer puts development resources into it. Adobe is doing the same thing. No marketing efforts from either of them—I think because Claris adopted the wrong approach and because Adobe's product contains no design capabilities.

**MW** Is there a market potential for computer forms?

**MORGAN** There is enormous potential for the right solution—something akin to MacInTax, with database and networking capability that allows the user to fill in information.

**MW** How does the generic forms engine underlying MacInTax work and how will you apply this technology to other products?

**MORGAN** The generic engine looks at a file description and determines how to read a form. It tells what part is the structure of the form and what part is a field, the data. We have an internal language for the form description—the mechanism for saying this is a point and this is a line—like PostScript, only not so developed as that. Like PostScript, it is very compact and machine independent in how it describes a document. Another part [of this language] is the encoded file that has the structure of the document. Finally, the user enters data, which is stored as an ASCII file. This is an open format that we make available to other developers, such as those of accounting programs.

Given that structure, all we have to do is to determine what are good forms. Those are what we call the "forms people love to hate"—the ones that require calculations. We encode these for our engine. That's the premise of our if:x Business Expense Reports package, which has five different layouts for expense forms. We also have General Services Administration and Department of Defense expense reports.

**MW** When will you ship your next forms product?

**MORGAN** if:x Forms Designer 1.1 shipped on September 17. We've added EPS output capability so that tables can be imported into PageMaker or QuarkXPress files. People build tables in those programs and it's a horrendous job. What users want to do is make changes in tables. With if:x Forms Designer 1.1, it's easy to make changes and export to DTP programs. Version 1.2, slated for year-end release, will allow scanner input to be used for tables and forms.

*(continues)*


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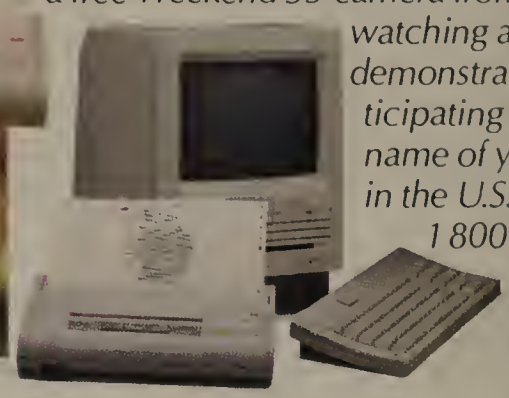

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**MW** What do you think are the trends in tax software?

**MORGAN** Electronic filing is a key impetus for tax preparers and taxpayers to process tax forms electronically. The tax information passes edit checks and is transmitted to the IRS in a file format specified by the IRS—saving the IRS millions of dollars in data entry. Begun as a pilot project several years ago, electronic filing became available on a nationwide basis last year. The IRS expects more than 40 percent of taxpayers to file electronically by the mid-1990s.

**MW** How does electronic filing work?

**MORGAN** The primary benefit to consumers is that they get their tax refunds back faster, typically within 10 to 14 days from the date filed. Consumers can also pay additional money for a Refund Anticipation Loan [RAL] offered by third-party financial institutions, which gives consumers a tax refund in three days. Last year, 4.2 million tax preparers filed electronically. Individuals who want to file electronically can use electronic filing services offered by H&R Block, banks, and companies such as Mail Boxes, Etc. We sell the electronic filing software, which edits and transmits the taxpayer's tax information to the IRS, to organizations that offer electronic filing. We also offer our MacInTax customers a process to file electronically. As a matter of fact, a MacInTax customer was the first to file a return electronically last year.

**MW** How did Block develop such an early lead in electronic tax filing?

**MORGAN** H&R Block prepares more tax returns than anyone else. They participated in the IRS electronic filing program throughout its pilot stage. H&R Block used CompuServe, which they own, to provide an electronic network to its tax preparers. In addition, they were very aggressive in offering RALs to their customers, using a third-party financial service.

**MW** Does the IRS provide any help or support for people who want to submit 1040s electronically?

**MORGAN** The government sponsors seminars for CPAs on electronic submissions. We went to one. We thought we would be lucky to see 300 people there, but there were over 1500.

**MW** What are the legal implications for your company in advising users?

**MORGAN** Well, the IRS has changed the laws on what constitutes advice. Passive loss is an example of a more complicated computer calculation in which the IRS says, OK, you're a copreparer. They try to get to the programs that give audit warnings or that give advice. They say that if the programs give advice, then their de-

*(continues)*


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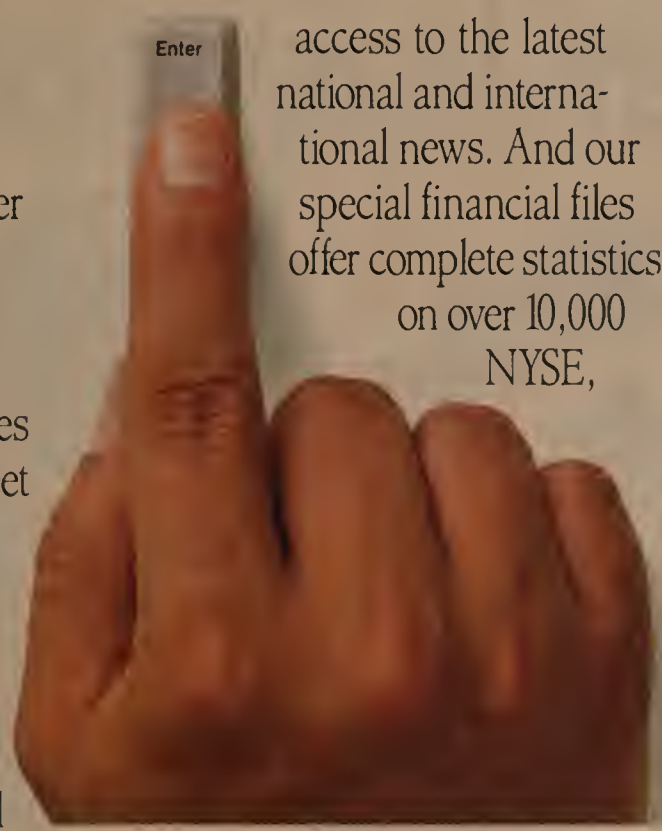


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**MW** At one point there was a considerable amount of ill feeling between your company and Claris. What was that all about?

**MORGAN** There was some trouble but it was resolved. I had a disagreement with some Apple employees who were in a position to provide Apple third-party developers with co-marketing funds. And we discussed our technology with them and talked about what forms needed to be. I found out later that the Apple employees were in fact Claris employees and their purpose in looking at our product was not to provide comarketing support at all.

**MW** Given that, what do you think of the developing situation with Claris?

**MORGAN** I believe what [developer] Dave Winer has always said: "Claris is Apple. Say that 100 times until you get that straight in your head."

**MW** What effect will that have on third parties?

**MORGAN** Third parties are faced with a situation more akin to that of Microsoft, where one company develops applications and system software. The company has access to vital information and hardware strategies that other people don't.

Microsoft claims this tremendous separation, but how do you prevent fellow employees from sitting down together for lunch and talking? And it doesn't matter whether an employee leaves the company, like Bill Campbell going to Claris. He was formerly vice president for field sales. So when he wanted information about a promotional campaign he knew who to call to get it. And you could say that about anyone from Apple. It's much more difficult for the third-party developer who hasn't developed these kinds of relationships.

**MW** Doesn't Apple evangelism provide that kind of information to you?

**MORGAN** It could do more than that, like involving the dealers in sales projects in some way. Kathy Lane [CEO of SoftView] has suggested that Apple form a software council consisting of 10 to 15 CEOs who would meet with a Mike Spindler to talk about Apple's markets and to develop ways in which to help its partners tackle these markets.

**MW** Is your husband still a guiding force in the company?

**MORGAN** Yes and no. He is working on the forms product but no longer on MacInTax. Now we have an entire research and development staff working on it—programmers, encoders who do the layout of the product, and tax specialists.

**MW** Delays in System 7.0 software continue. Is that a problem for you?


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**MORGAN** MacInTax is so seasonal that we can't put our next version in 7.0. But Forms Designer 2, targeted for '91, will incorporate 7.0 features.

**MW** Windows versus the Mac Operating System. What's your point of view?

**MORGAN** We've been developing for Windows for some years now. MacInTax for Windows [originally called Taxview] was out in 1987; now we're developing new products for Windows 3.0. It's hard for me to imagine that Windows 3.0 will not be a player. But it's where the market develops from current DOS users that will determine who has the capacity to run Windows.

There are still ways in which the Mac is superior, but 3.0 has some superior features as well. Fonts are better handled on the Mac, but that will change. The market for the Mac remains to be seen. [At present it is] DTP and multimedia; some real application of that may develop.

**MW** What will be the impact of the low-cost machines?

**MORGAN** We've been waiting for a long time for these machines to benefit MacInTax. It's not a business program, it sells to individual users doing taxes. Apple needs to broaden its base to increase support for its products.

**MW** A new wave of vendors is coming over from the PC community. Do you expect more competition?

**MORGAN** There is one such program that we know of, a personal tax package. One would expect a good company to produce good programs, but we haven't seen it. MacInTax is well loved by users; we're responsive, and we are making the product better.

**MW** Apple has done a lot to support the large companies in developing Mac products. To what result?

**MORGAN** When the Mac first came out and was not compatible, Apple felt that it needed Ashton-Tate and Microsoft to prove to the world that its machine was a player. The question is why Apple still feels that way after this complete failure [of the big companies], and given the success of companies like Aldus.

**MW** Are you developing a product for the Next machine?

**MORGAN** Not currently. It's difficult to predict downstream what its market share will be. It does have good graphics and a good development environment, but we have to feel there will be an installed base.

**MW** You've been outspoken about a need for access to Apple's executives.

**MORGAN** If you look at Mac sales we're among the top 10 or top 20, and we've been on the Mac for a long time. We have no access to [Apple's]

*(continues)*


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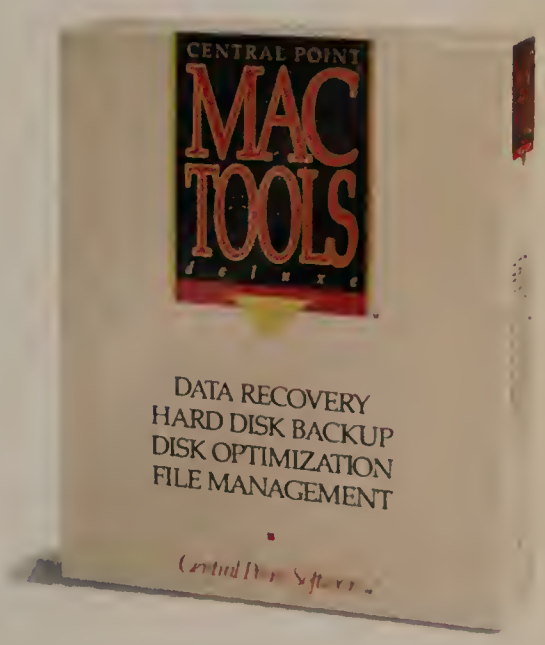


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field sales. To formulate a business plan for the new low-cost Macintosh, who do we talk to? Apple says see your evangelists. But they're not the people who can act [on policies or programs], so at best we're having conversations four times removed from the people who actually make the decisions. That's obviously not the best way to deal with Apple's top developers.

**MW** I understand you're working on an important strategic alliance.

**MORGAN** We're talking with one of the Big Six CPA firms, about a sharing of technology. They would provide us with the expertise that we don't have so that we can do more forms products for states, plus fixed assets, and corporate forms, all of which we will bring to our own market under both the Mac and Windows.

**MW** What technology is missing in the Mac market today?

**MORGAN** Technology to support forms and databases on networks, and to do routing of documents. That's what is needed for the paperless office.

**MW** The Mac is already the most networked personal computer.

**MORGAN** You need products that can support the networking. Another thing that would help is a unified imaging model.

**MW** Isn't that what TrueType and TrueImage are all about?

**MORGAN** Yes. But they're not here today. And we don't know when they will be. Still, it's worse on the IBM. And QuickDraw doesn't do you any good when you need to output to a high-resolution laser printer. You're printing to PostScript, which is not identical to what you have on screen. That really shows up in CAD/CAM or in printing a form. On the screen you have type above a line, and when you print you have type on the line.

**MW** What would you do if you were president of Apple?

**MORGAN** I would target strategic markets with specific solutions. I would quit talking about multimedia, a market without specific products or solutions. What good is it to talk about technology without products? I would get together with key developers to determine where the markets are, and what solutions are needed to get users to buy into them. I would also worry about losing developers. Mac-only developers are a rare breed. And small developers have to put some of their resources into another platform effort. That diminishes the effective resources needed to produce new Mac products, diluting the effort being spent on the Mac market.

**MW** What has happened to the accounting software market on the Mac?

*(continues)*


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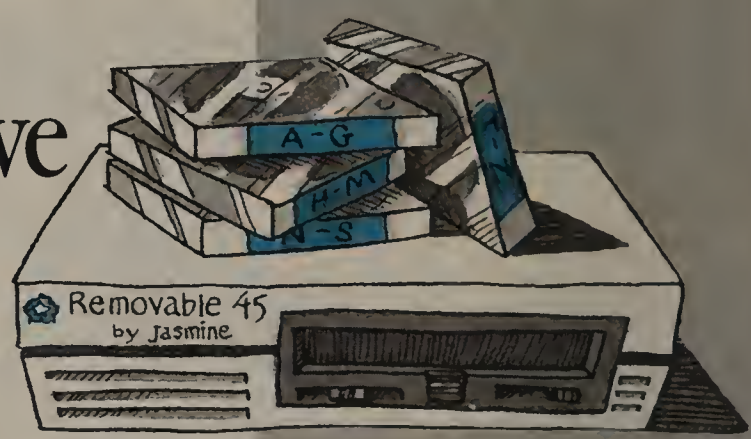


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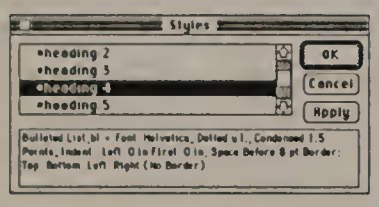


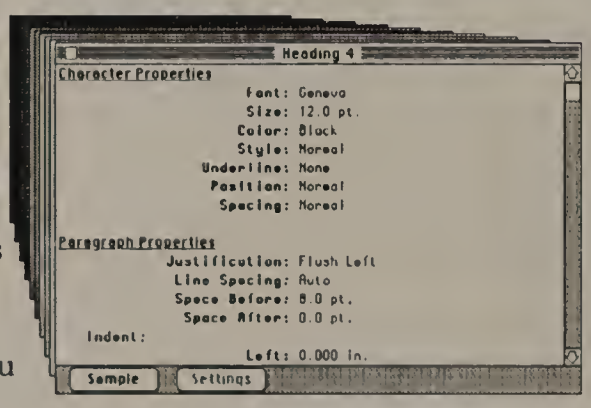


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**MORGAN** Apple doesn't support it. In fact, it doesn't do well in vertical markets in general except for DTP. It's not focused. We've been waiting on a general business machine. For a while there was an evangelist and a co-marketing person for accounting. Then they were re-org'd away. Now they're coming back. The people in this area have changed several times over because of re-orgs. It takes commitment to long-term development [to make progress], and to some extent the products weren't there.

When we were Mac only and needed comarketing support from Apple, we were forced to go it alone.

**MW** Apple talked about its strategic alliance with Arthur Young for years.

**MORGAN** Arthur Young, a major client of Apple's, loved MacInTax. We were on their internal buy list. Then they merged with Ernst and Whinney, and that's how the Big Seven became the Big Six. Whinney was an IBM shop. For a while the new Ernst & Young battled over which machine to standardize on. Where was Apple? We worked with them [the staff at E&Y] during the time they were considering going to IBM and advised Apple to spend some time in there or risk losing a national account. Meanwhile, quite a battle was taking place at E&Y. There was a report of people handcuffing themselves to their Macs and resisting their machines' being replaced by IBMs. E&Y OK'd leaving the Mac in the few places of greatest resistance. Eventually E&Y decided to switch to the Mac, except for the tax department, which went with IBM. Sculley took the E&Y executives to dinner but could not convince them to switch the tax department to Macs. We understand a major deciding point at E&Y was the lack of a broad product line available on the Mac to support accounting and tax needs. I think the failure of E&Y's tax department to go Mac is indicative of our major issue with Apple—their inability to establish the Mac as a viable hardware platform for markets other than DTP. We are one of only a few Mac software companies that have had success establishing a product in a vertical market. ◻

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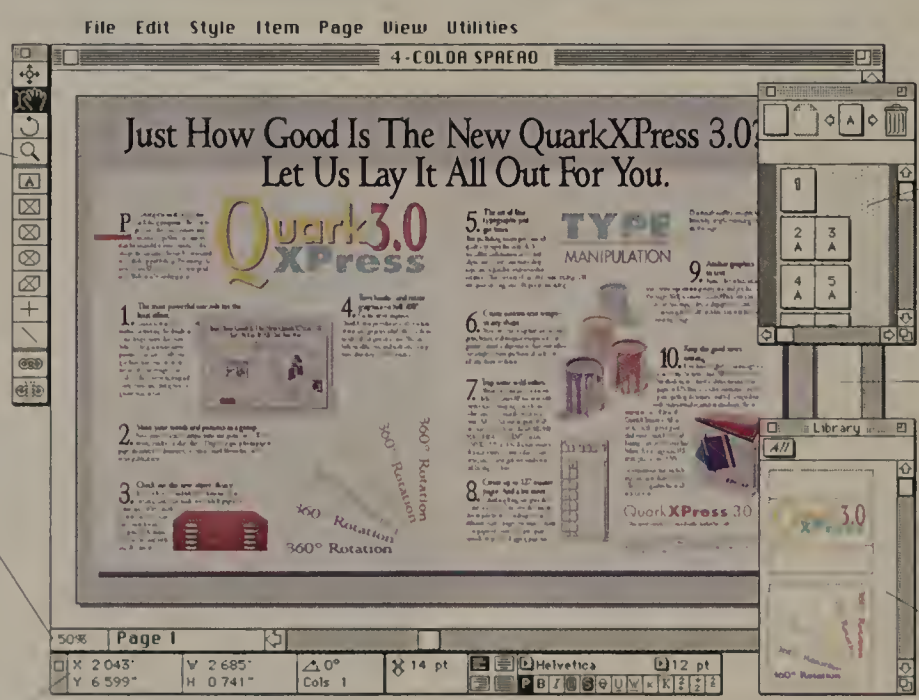


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# Smart Chart Art

## How to transform an Excel chart into something special

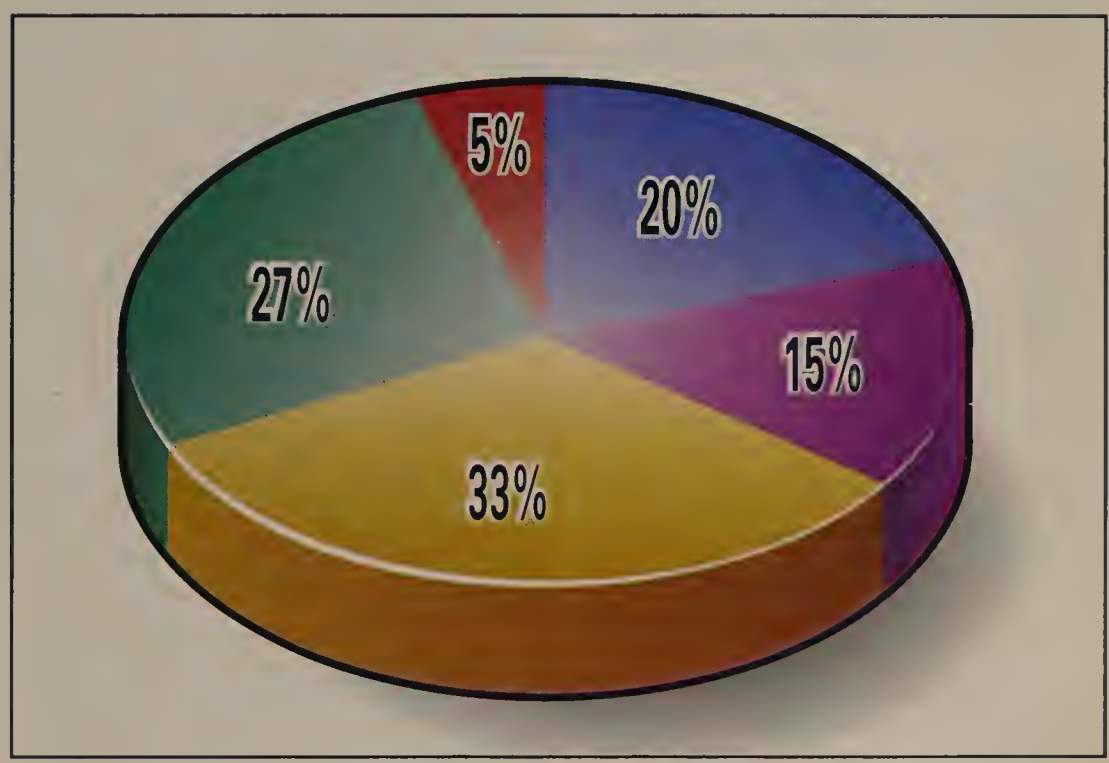
BY ARNE HURTY AND CATHY ABES

If you're a Microsoft Excel user who routinely produces business proposals, reports, or newsletters, you've probably churned out plenty of charts and graphs in Excel to go along with your text. Have you ever thought about jazzing up those standard-issue charts with some striking special effects? Maybe you've wondered how we create our charts and graphs for *Macworld?* We thought you might like to see how it's done and even try doing it yourself, so we've devised a tutorial to take you through a part of the process.

Here, most charts begin life as Excel files and end up in Aldus FreeHand—because it offers powerful typographic, color, line, and fill controls, as well as process color (which is commonly used in color printing of magazines and other publications).

You could import an Excel chart into Adobe Illustrator instead of FreeHand, but an extra step is required. DrawOver, a utility bundled with Illustrator, converts PICT files into Illustrator files but can't convert Excel files directly. You must first paste an Excel chart into a program that supports object PICT (such as MacDraw, MacDraft, or SuperPaint) and save it in object PICT for conversion into Illustrator format.

Illustrator 3.0, which may be available by the time you read this, will include a new graphing tool that lets you enter or copy data into an Illustrator worksheet from which you can create any standard type of graph or chart within Illustrator. And because you won't need to import your chart from Excel, it won't contain any extraneous elements to be removed (as described in steps 2 and 3 of our tutorial). Other than that, the steps for dressing up a chart in Illustrator 3.0 should be quite similar to those we've described for FreeHand.




FreeHand interprets colors in an Excel chart as patterned (bitmapped) fills, with a different pattern assigned to each color. Although FreeHand supports any fill patterns created in Excel, you can do less with them in FreeHand than you could in Excel.

At first glance an Excel chart imported into FreeHand may look unchanged, but there are actually quite a few differences—some immediately noticeable, others not so obvious. Because the chart automatically converts into a PostScript image, all its elements—lines, pattern fills, fonts—become separate objects that you can manipulate as you would any object created in FreeHand.

You're better off selecting one of FreeHand's other fill options from the Fill menu—Basic, Graduated, None, or Radial (avoid the more complex fills, Tiled and PostScript, until you're more familiar with FreeHand). Now you can customize fills as well as name and apply them to selected elements.

Although most of the type effects available in Excel transfer smoothly to FreeHand, there are a few exceptions. Underlined type loses its underline. A strikethru becomes a separate line drawn over the type that can be manipulated independently of the

*(continues)*

type. Outline and shadow become PostScript effects (in the Type menu under Effects) that will print out, but they're invisible on screen. This can create confusion if you're using several effects on different parts of your text. But FreeHand's many drawing layers can help you keep track of which text is which. For example, if you've used shadow on some parts of your text and outline on others, send the outline text to one layer and the shadow text to another, making a note of which layer contains which type of text. Even if you're using only one type style, you should put the type on one layer and the chart on another so that you can easily manipulate one without disturbing the other.

Graphic elements in Excel—such as tick-marks, bars in a graph, or the outline of a graph—become *simple lines* in FreeHand. By individually ungrouping these elements, you can convert each one into a PostScript path, an object whose shape you can dramatically alter in a variety of ways. More complex shapes such as arcs and curves automatically translate to FreeHand as PostScript paths.

One type of element that doesn't translate well is a dashed line. Once in FreeHand, each segment of a dashed line becomes a separate entity, making the line awkward to work with. It's much better to start with a solid line in Excel and change it into a dashed line in FreeHand by using the Pattern control in the Basic line dialog box under the Line menu. You can customize a dashed line in the Line pattern dialog box (to access it, hold down the Option key while scrolling to a new pattern).

Once a chart is finished, you can save it in FreeHand as an Encapsulated PostScript (EPS) file (for importing into a page-layout program). In this format, it retains all color and line attributes and can be stretched or shrunk without losing its sharpness.

If you're like most business people—with few artistic inclinations—you may be thinking that dressing up an Excel chart in FreeHand or any other drawing program is beyond your scope. But if you try this straightforward tutorial, we think you'll change your mind.

# FROM PLAIN TO FANCY

Follow these steps to transform a simple Excel pie chart into a sharp-looking 3-D chart for process-color printing.

## 1 FROM EXCEL INTO FREEHAND

With Excel and FreeHand open under MultiFinder, create an Excel worksheet. Under column A enter the following numbers in the first five rows: 20, 15, 33, 27, 5. Create a chart (select New from the File menu), select Pie under the Gallery menu, and double-click on example 6. Then select all and copy to the Clipboard. Next, switch to FreeHand, open a new file, select Include process colors in the Document Setup window and paste the pie into the file.

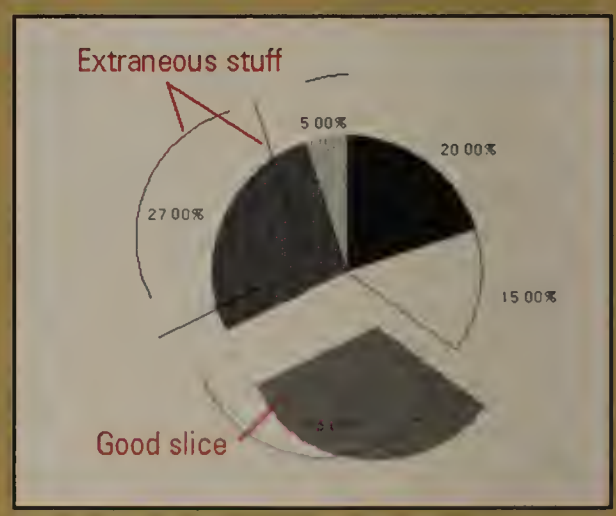
Ungroup the pie using the Ungroup command in the Element menu (⌘-U). (If your pie is just an outline, choose Preview under the View menu (⌘-K) to fill it in like the one shown here.)

## 2 ISOLATING THE EXCESS

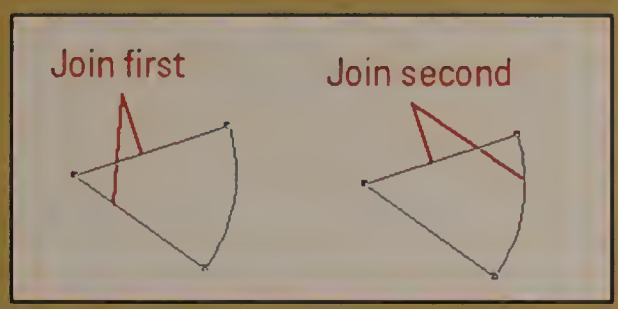
Once the pie is ungrouped, deselect the elements by clicking on any blank part of the screen with the pointer tool or by pressing the Tab key. Then save the FreeHand file.

You'll need to delete a lot of extraneous elements (such as line and curve segments outlining the pie slices) from the chart. Begin by selecting individual line segments and dragging them off to the side. If you accidentally pick up a complete piece of the pie, use the Undo command under the Edit menu (⌘-Z) to put it back in its original position.

Use the Send to Layer command (choose Arrange under the Element menu or ⌘-hyphen) to put all the pie slices on a different layer (in this case, use layer 50) below the current layer (100). These pieces will still be visible and selectable.



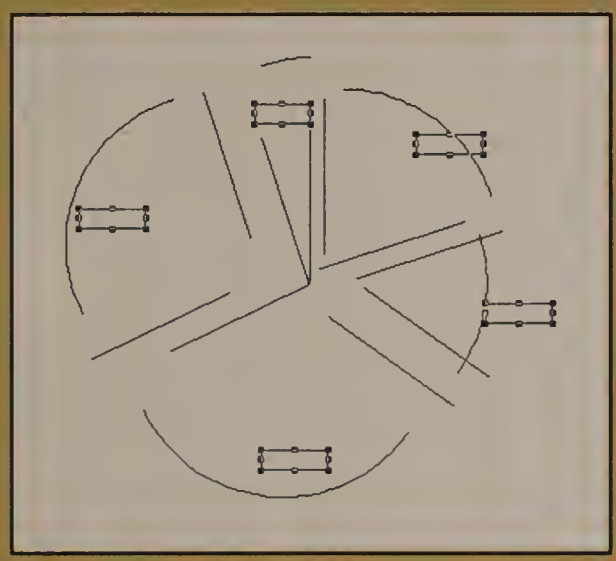
If you find a pie slice with no fill (one that's made up of only line segments), select one line segment and ungroup it. Do this for each straight line segment individually so that all the segments can be connected to make one shape. While holding down the Shift key, select the two straight line segments and then choose Join (under Special in the Element menu or ⌘-J). Then hold down the Shift key, select the arc, and choose Join to complete the slice. With the slice still selected, use the None command under the Line menu and send the slice to layer 50 with the other pie pieces.




## 3 REMOVING THE EXCESS

After isolating all the excess line segments on layer 100, select Layer Control in the View menu. Set active layers to Drawing layer only and set Visible layers to Active layers only. While holding down the Shift key, select all the type and send it to layer 150.

Since layer 150 is not active, the type is no longer visible but its selection frame is. Deselect the type with the Tab key. All the extraneous line segments are isolated on layer 100 (the active layer), so choose Select All from the Edit menu (⌘-A) and delete them. Finally, go back to the Layer control dialog box and reset Active layers to All and Visible layers to All layers. Now it's time to dress up the chart.



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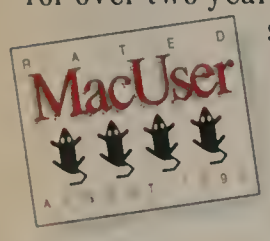


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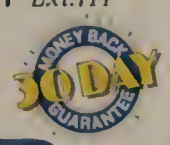


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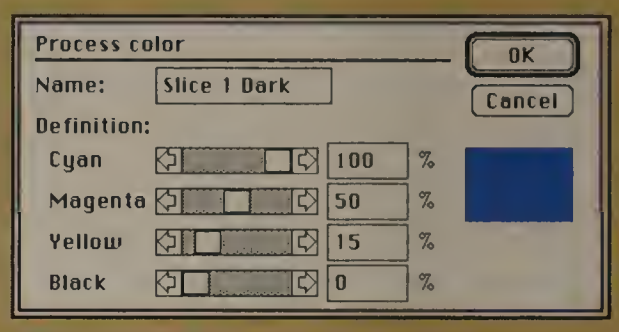
## 4 CHOOSING COLORS

Under the Color menu, select Process color. The resulting dialog box lets you enter the name and attributes of each color. Create a dark and a light color for each pie slice. For each color, enter the name (for example, Slice 1 Dark) and the attributes (100 cyan, 50 magenta, 15 yellow), and click on OK. (To simplify the tutorial, we've chosen colors and attributes for you, but you can experiment with your own choices if you prefer.) After you set up the colors as shown below, save your file. Cyan, magenta, and yellow are indicated by c, m, and y.

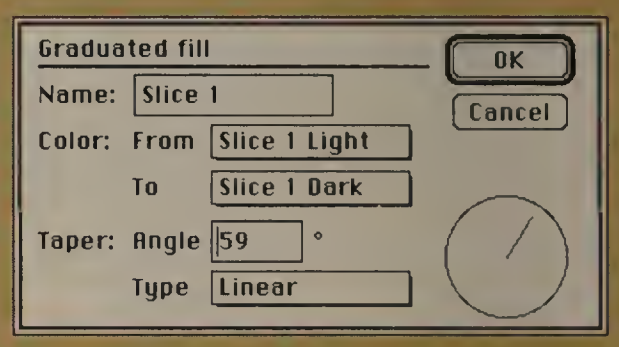
Slice 1 Dark: 100 c, 50 m, 15 y
Slice 1 Light: 20 c, 10 m
Slice 2 Dark: 50 c, 100 m
Slice 2 Light: 10 c, 20 m
Slice 2 Black: 80 c, 100 m, 40 y
Slice 3 Dark: 15 c, 35 m, 100 y
Slice 3 Light: 5 m, 20 y
Slice 3 Black: 40 c, 70 m, 100 y
Slice 4 Dark: 100 c, 20 m, 60 y
Slice 4 Light: 20 c, 10 y
Slice 4 Black: 100 c, 70 m, 80 y
Slice 5 Dark: 20 c, 100 m, 80 y
Slice 5 Light: 20 m, 10 y




## 5 APPLYING FILLS

Select the first slice at the top of the pie, and choose Graduated from the Fill menu.

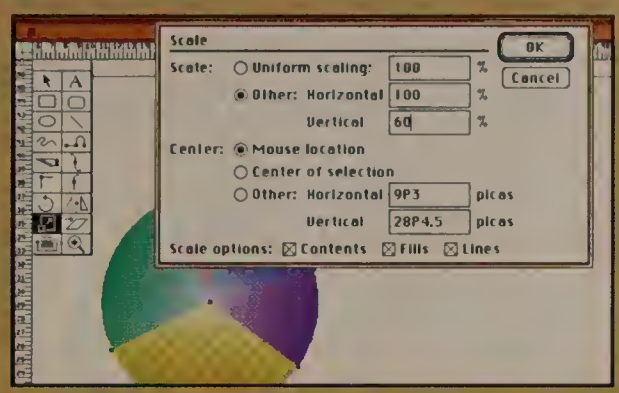
In the Graduated fill dialog box that appears, enter a name for the fill that corresponds to its slice (for our example, Slice 1). By clicking and dragging, scroll to find the From color (Slice 1 Light) and the To color (Slice 1 Dark). Adjust the angle of the fill by using the mouse to move the radius within the circle so that it bisects the pie slice. Select Linear as the fill type and click on OK. Select the next slice (going clockwise) and repeat, following the same process for each slice. You can go back and adjust the direction of the fill in any slice by selecting the slice and selecting Edit fill under the Fill menu (or ⌘-E). When you're satisfied with all the results, save your file.



## 6 ADDING PERSPECTIVE

Use Layer Control (in the View menu) to set the Active and Visible layer to Layer 50 and Select all (⌘-A). Select the Scale tool, and while holding down the Option key, click anywhere on the drawing area.

In the Scale dialog box that appears, enter a reduction of 60% in the vertical scaling box, and click on OK.

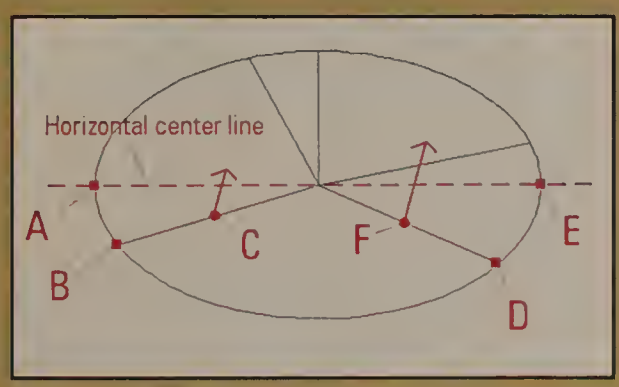



## 7 DRAWING AN EDGE

Deselect the pie (Tab key) and type ⌘-K to put the drawing in Keyline mode (to see the structure of the elements without the color). With the Shift key depressed, use the pointer tool to select all the pie slices whose outside edges are (completely or partially) in the bottom half of the pie (in our example, slices 2, 3, and 4).

Then use the Clone command in the Edit menu (or ⌘-=) to make duplicates of the selected slices directly on top of the originals. Deselect using the Tab key and select Slice 4 by clicking on its outside edge.

Select the knife tool from the tool box and cut the arc of Slice 4 at point A as shown (where the horizontal center line meets the left edge of the pie). Then cut at point B to separate the arc AB from the rest of the pie slice's outline. Deselect (Tab key). Select and drag from point C. If the piece you just moved looks like the example, delete it. Now select Slice 3 and cut at points B and D. Select and drag again from point C, and delete. Select Slice 2, cut at points D and E. Select and drag from point F, and delete. Now you should have three arc segments.

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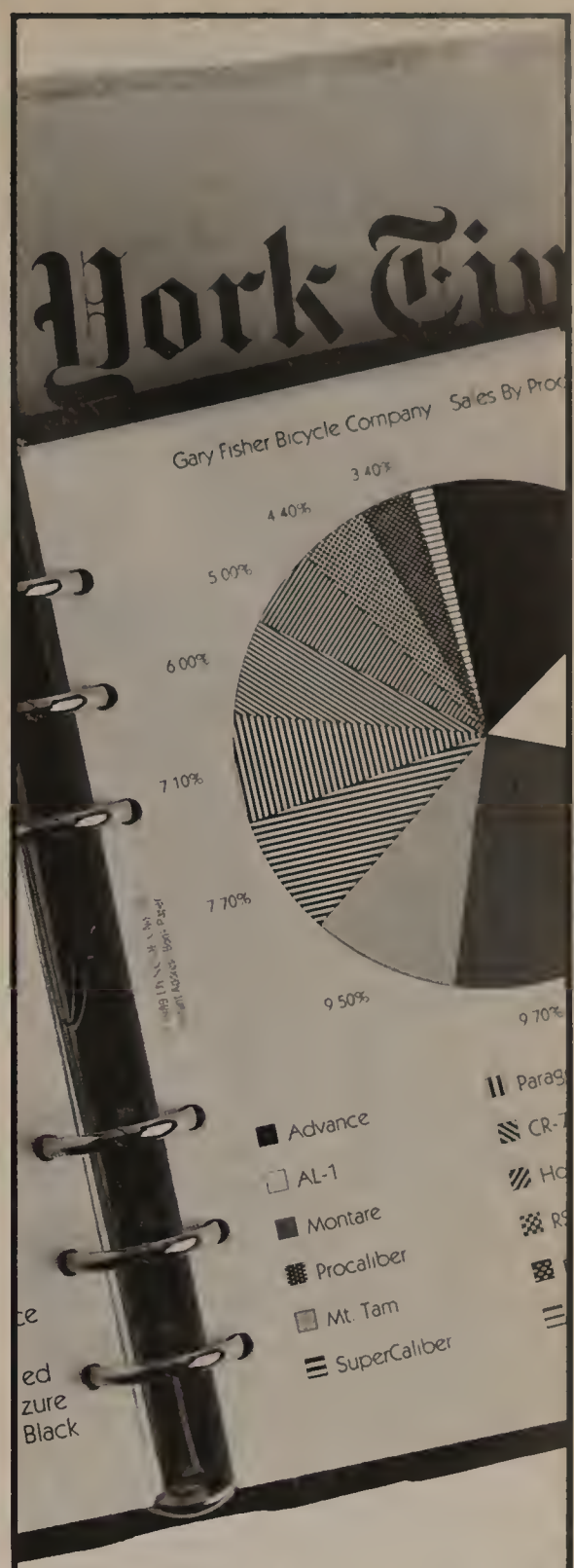


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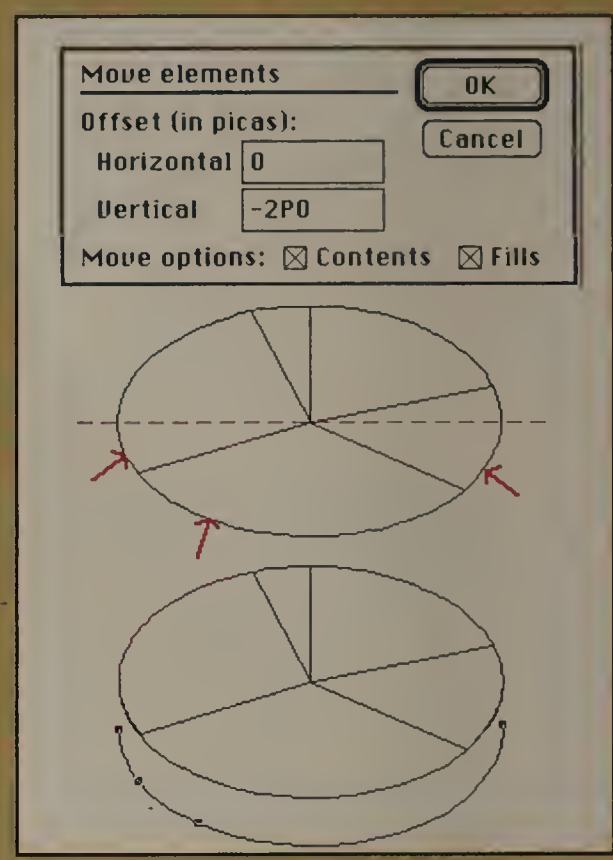
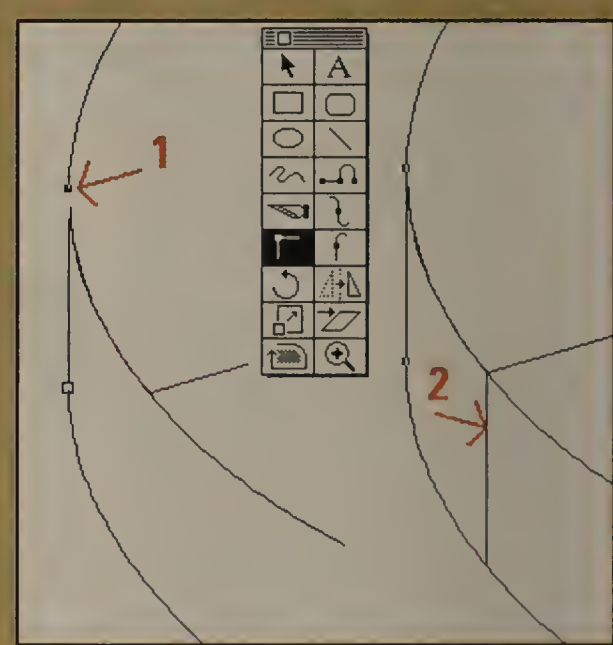
## 8 DRAWING A WEDGE

With the Shift key depressed, Select the arcs in the bottom half of the pie, making sure to click only below the horizontal center line of the pie. Now choose Clone from the Edit menu (⌘-=).

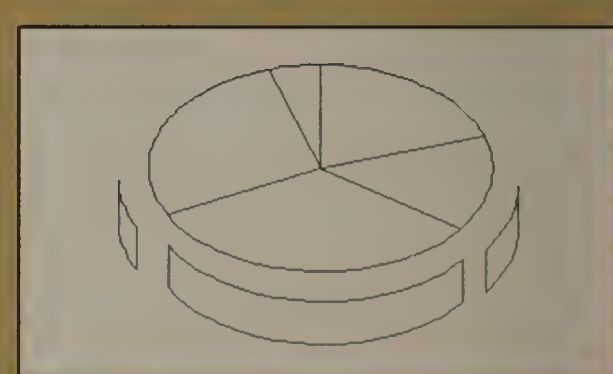
Choose Move (Element menu or ⌘-M) and the Move elements dialog box appears. In the Horizontal box, type 0. To create a wedge that's 2 picas thick, in the Vertical box type -2P0 (to move the three arcs down 2 picas) and then click on OK. Move the arcs down further to create a thicker wedge; for example, -4P0 makes it 4 picas thick. Deselect (Tab key). Use the pointer tool to select the leftmost arc segment on the pie (below the horizontal line).




Highlight the point that appears on the arc (1) by clicking on it, then select the corner-point tool. Drag a straight line from the highlighted point to the edge of the cloned arc below. Select the pointer tool and while holding down the Shift key, select the bottom arc. Choose Join (⌘-J) to join the two segments. Then with the joined segment still selected, type ⌘-I to open the information dialog box, check the Closed button, and click on OK. This creates a new line (2) at the rightmost side of the wedge, closing it. Select the next arc (going counterclockwise on the pie). Highlight the leftmost point. Then, using the corner-point tool, trace over the right edge of the line. Select the cloned arc, join it to the arc above, and close the path—just as you did before.



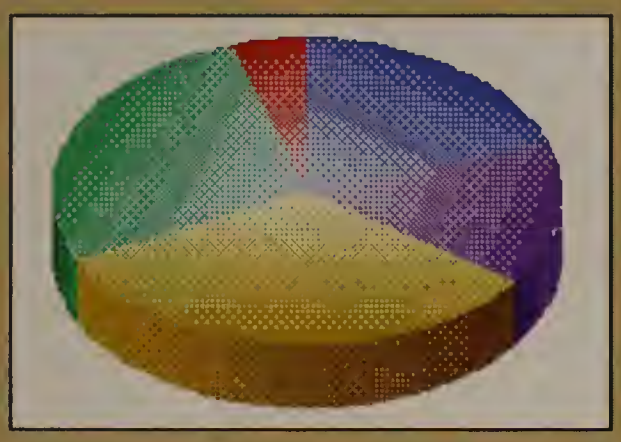

Click and drag each wedge away from the pie to make sure you've created them correctly. Then use the Undo command as many times as it takes to put each piece back where it was.



## 9 FILLING THE EDGES

Select the left edge segment and choose Graduated from the Fill menu. For the From color, select Slice 4 Black, and for the To color, select Slice 4 Dark. Make the Angle 0 degrees and the fill type Linear. You won't see the fill because you're in Keyline mode. For the middle edge, make the From color Slice 3 Dark, the To color Slice 3 Black, the Angle 0 degrees, and the fill type Linear. For the right edge, make the From color Slice 2 Black, the To color Slice 2 Dark, the Angle 0 degrees, and the fill type Logarithmic.

Choose Preview (⌘-K) to see the pie in color.

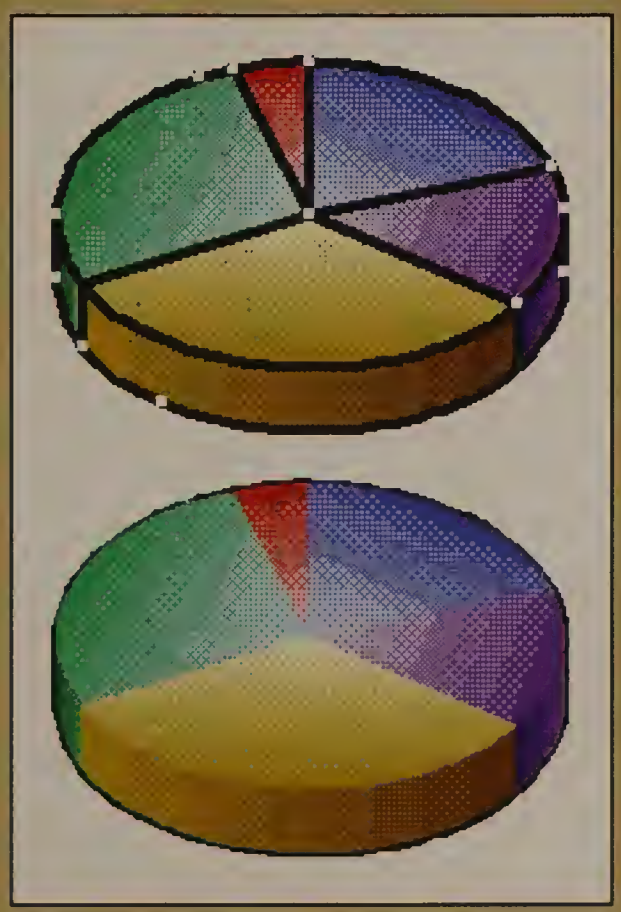


## 10 CREATING AN OUTLINE

While still in Preview mode and on layer 50, select all the pie slices (⌘-A). Now choose the Clone command (⌘-=) to create a duplicate of the pie directly on top of the original; the copy you make is selected. Leave it selected and choose the None command under the Fill menu to give all the cloned segments a fill of None.

After choosing Basic from the Line menu, you'll see the Basic line dialog box. Define a line that's twice as thick as you want the outline to be. For this example, create a line that's 4 points thick. If the default measure for the file is set to some other measure than picas or points, you can override it by typing **0P4** in the Weight box. In the Color box, select Black. In the Name box, type **Outline**. Select the rounded-corner option under Join, and click on OK.

The cloned pie now has thick borders around each slice. Send the still-selected cloned pie to layer 40. Set all layers to Visible and you'll notice an outline surrounding the pie chart.



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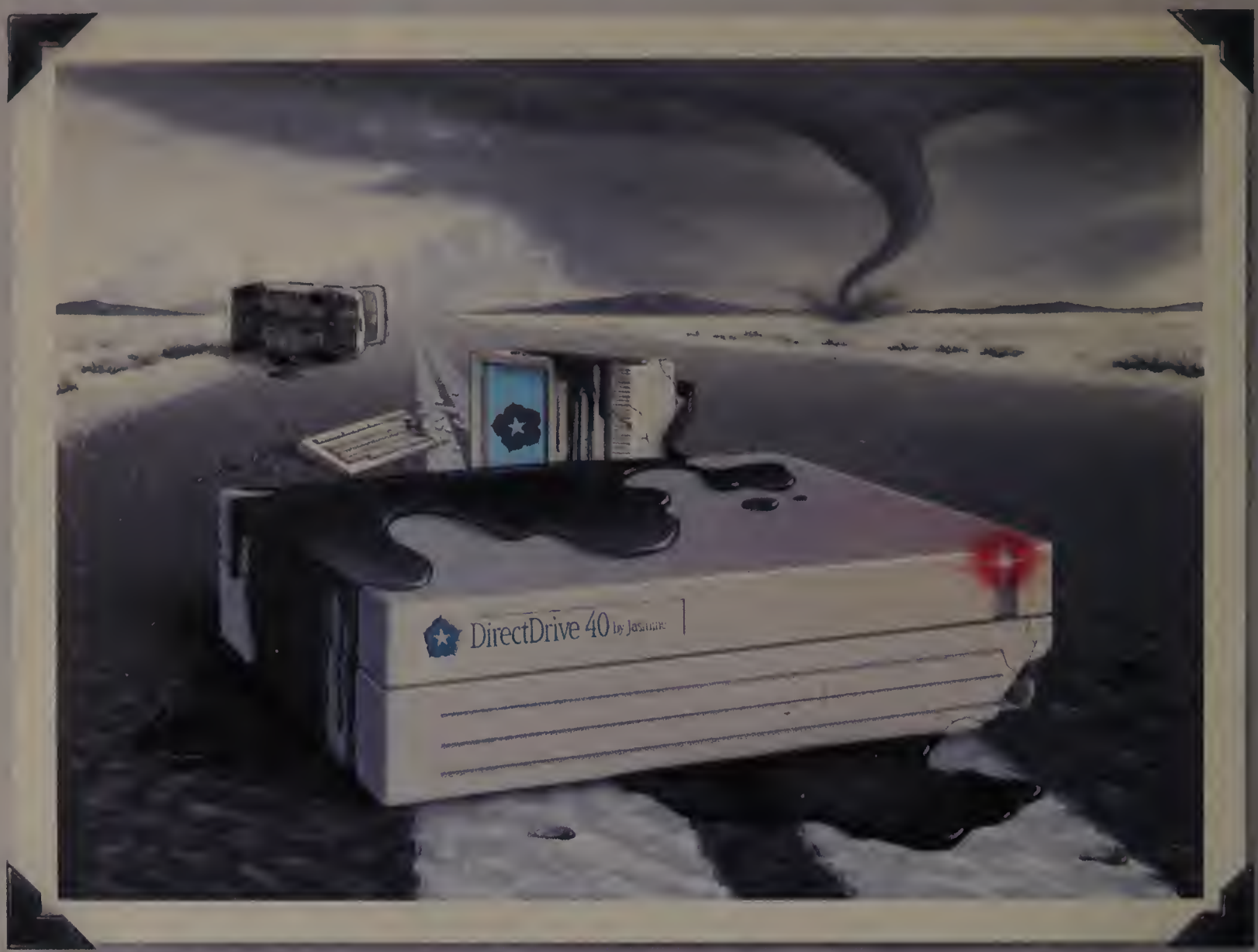
# Guess Who Survived a Tornado!




Dear Jasmine Technologies,

Occasionally we win one.

On 11/15/89, as I was driving home from work, a tornado formed just to the west of me. I had enough time to pull into a safe parking lot and duck down. The "safe parking lot" turned out to be right in the path of the tornado. I was knocked out as the 200 MPH winds struck, flying my car—and me—nearly 300 yards. I woke up in the hospital with a severe concussion and blood loss. As part of the $250 million storm damage, my car was totalled and my computer was lost.

After I was released from the Hospital, my wife and I went to the Police Station where some "valuables" had been rescued from the disaster scene. There was my Macintosh SE with its Jasmine drive. The hardware was in sad shape; the front SE surface was bashed in, there was a big piece missing from the Jasmine Drive, and both were coated with a mixture of motor oil, antifreeze and water. The insurance company agreed that it was a total loss. But, realizing that the damage was finite, I began cleaning and straightening out everything. I jokingly powered up—IT WORKED! The bashed-in Jasmine drive booted the straightened out SE giving me a happy Mac, displaying the partitioned icons and sat there waiting! The clock was even right! So far, the drive has yet to fail.

I'm writing this letter (on the Jasmine drive) of appreciation to all of you in hope that you will be as pleased as I am that your products survived the forces of a major tornado that was blowing manhole covers around like frisbees. I don't have the foggiest idea where the drive ended up, but judging from all the junk coating it, it must have been found under one of the piles of destroyed cars.

In summary: the car was totalled, I was almost totalled, but the Jasmine drive made it O.K. Congratulations on making some darn good stuff. I plan to take the scarred hardware to work and continue to use it there as a reminder of one of the positive aspects of that unfortunate experience.

Sincerely,

Eugene K. Lawson

Gene Lawson

## The New Jasmine...

For the last four years Jasmine has continuously been the leader in the Macintosh hard drive market. We're proud to announce that we are now a division of Chess, a dominant force in the European Macintosh market. With our new management we are producing the kinds of innovative products that we've become known for.

## Look at the Service...

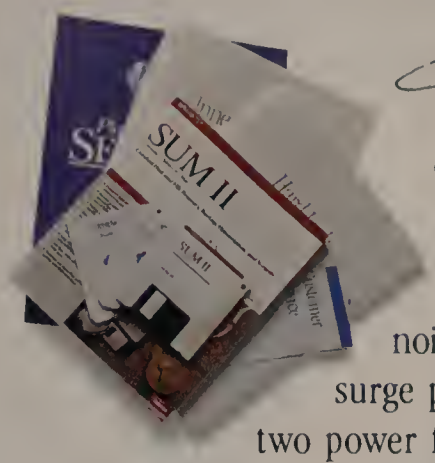
Jasmine's Platinum Flower Service is focused on our Customers. Over 25% of our staff is dedicated to Customer and Technical Support. Each Jasmine drive is thoroughly burned in and tested before shipping and we include informative manuals and detailed troubleshooting guides to help with any problems that may arise. If you're not satisfied with any aspect of your drive, you have 30 days* to return it for a full refund and, should your drive need help, the Platinum Flower line has a 2-year repair warranty.

## Don't Take Our Word for it...

Jasmine Technologies has consistently finished first in the MacUser Labs' Buyers Guide and we've been praised in every major Macintosh publication for the quality of our drives and for the ease of use of DriveWare, our custom drive utility. Jasmine has earned more MacWorld and MacUser awards for Macintosh peripherals than all of our competitors combined.

## Now, Consider the Alternatives...

Go ahead, check out the competition. We could use cheaper parts and have the same kind of "too good to be true" prices as some drive makers, but remember, if it sounds too good to be true, it probably is. We'd rather spend a little more, *not* cut the corners, and produce a premium drive at a non-premium price. We've set the standards and we will continue to lead the industry now and in the future. Simply put, there is no substitute for the best.

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| Platinum Flower Line | |
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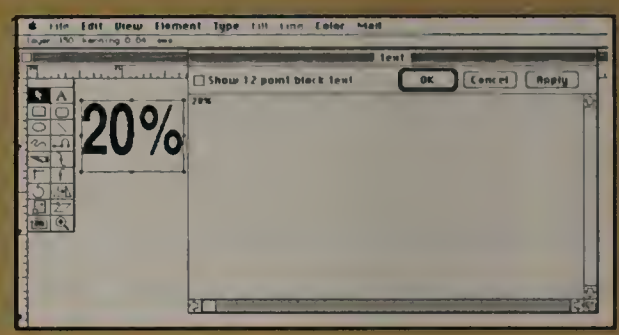
## 11 TUNING UP THE TEXT

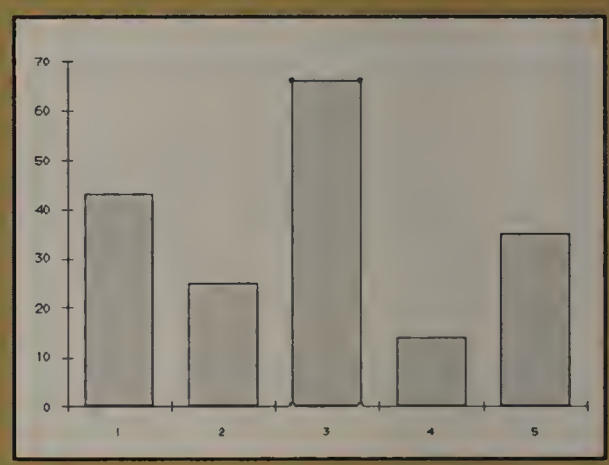
To tweak the text labels (ours contain percentage values) for the pie slices, position each to correspond to its slice by clicking and dragging the number. Then select all the numbers and use the Font submenu under the Type menu to select a font (we've chosen Helvetica). Select Horizontal scaling (Type menu) and enter **70%**. In the Type menu under Style, choose Bold.

To add space between the number and the percent sign, use the Magnifying tool to zoom in on a block of type. Then select the block and type ⌘-I. Place the cursor between the zero and the percent sign. While holding down the ⌘ key, press the right-arrow key to add space.

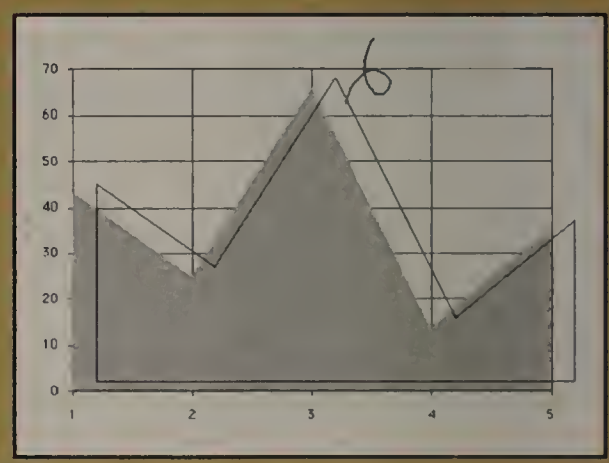



### Other Types of Graphs

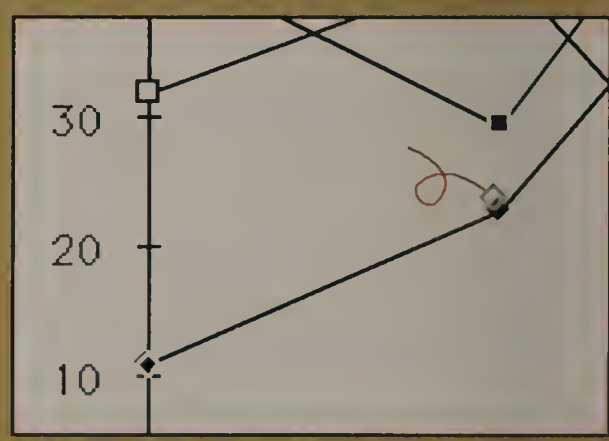
Importing bar or column graphs into FreeHand converts the elements into lines and rectangles. Check to see if any tick marks are buried where the *x* and *y* axes meet. You can ungroup the bars individually and highlight their end points to change their length. You can also ungroup the tick marks individually to highlight and stretch them simultaneously across the graph.




With area graphs, each area comprises two elements: one has a fill with no outline and directly on top of it is an outline with no fill. Select the outline, drag it off to the side, and delete it. Then assign an outline to the fill that remains, so you're left with one element containing both fill and outline.




With scatter plots and line graphs, FreeHand interprets each graph category as a different shape. If a graph has three or more categories, one of them is represented by a diamond-shaped element. FreeHand treats diamonds the same as areas—as two elements, the bottom one a fill with no outline and the top one an outline with no fill. Just as with the area graph, delete the outline and assign an outline to the fill. ■



# The database that helps Federal Express® deliver buildings overnight.

Ric Honey, a project manager of new construction for Federal Express, knows a little about deadlines.

"People say to me, 'We need this building next month.' I say, 'But that's a 1-year project.' They say, 'OK, 3 months.'

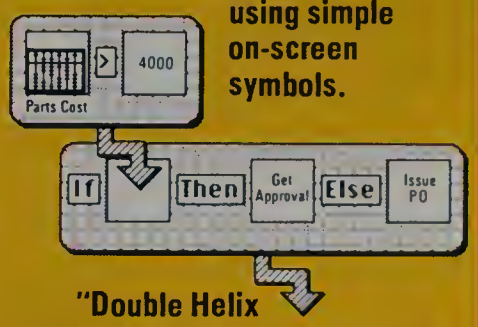
"Managing 4 or 5 projects like that can mean a paper trail of over 600 forms at a time. All with pen and paper. I knew I had to do something."

So Ric looked into a database program for his Macintosh.® "I chose Double Helix® because I didn't want to learn a programming language.

"I had a spreadsheet, and I knew it could do 'macros.' But *I* couldn't. If I could tell it in English what I wanted, fine. But I'm an awful typist. One finger. Try doing macros with that!

"When they told me about Double Helix, I said 'You mean I don't have to read anything? All I do is drag around icons, pictures? This is great!"

**Only Double Helix lets you manage information your way, using simple on-screen symbols.**




**"Double Helix makes sure all the big expenses come up for my approval."**

Now Ric and his team run the Double Helix multi-user application he created. He reports it's already cut 25% off his paperwork time.

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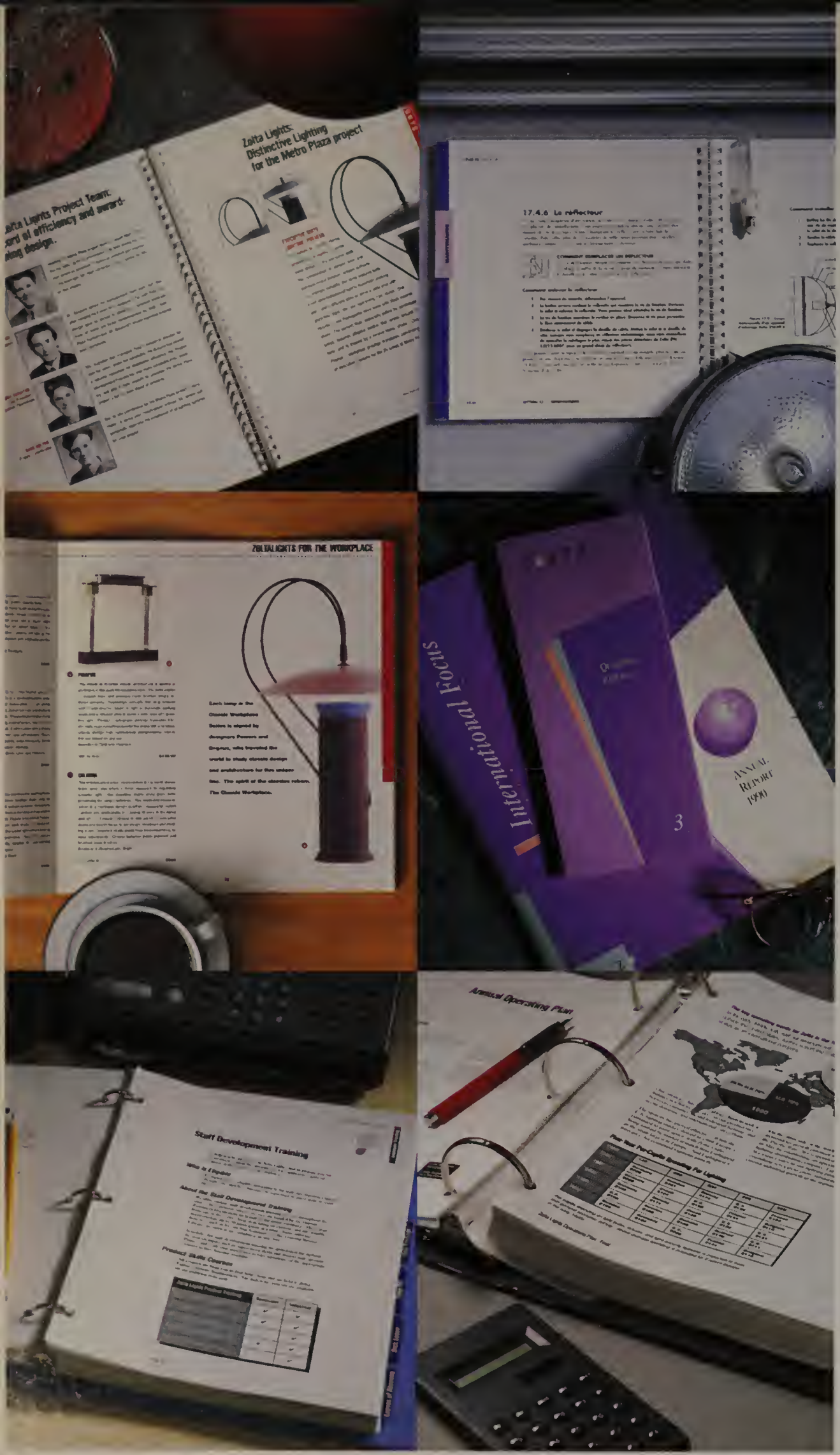
**Double Helix.**

**Circle 352 on reader service card**



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# MACWORLD NEWS

by Dan Littman and Tom Moran

## War of the Roses

Yet another standards battle is erupting, this time over the issue of color calibration and matching. The two major contestants—SuperMac and Radius—both made announcements at Boston Macworld Expo about new and existing products, while taking a few shots at one another. Other color technology firms indicated that they might get involved in the dispute over color matching, either supporting existing solutions or introducing their own.

The issue at the heart of this conflict could be described as spectrum WYSIWYG: how to ensure that the colors you see on your screen match the colors you get on your output device (printer, film recorder, and so on) and the colors coming in from your input device (color scanner). There are two basic problems involved: calibrating color monitors so that they show the same colors, and providing applications (and users) with a set of colors that appear identical on all devices.

SuperMac introduced the SuperMatch Professional Color Matching System, which comprises the SuperMatch Display Calibrator, supporting software, and a replacement for the standard Macintosh Color Picker panel. Based on the TekColor model developed by Tektronix, the SuperMatch system is touted as being compatible with a wide range of devices and applications. SuperMac has also promised future support of the Pantone color matching system.

Radius fired back with a new software release (version 1.2) for the Radius PrecisionColor Calibrator, making it compatible (for the first time) with some non-Radius monitors and citing support for Pantone, ANPA, and Ad-Litho color matching systems. They also opened up their approach, releasing a developer's toolkit that enables third-party firms to add PrecisionColor support to their applications. Aldus, Quark, and Letraset have all announced plans to support the Radius standard.

While disputes exist over which technology is better, SuperMac's approach has one powerful advantage—it's transparent to most applications, while Radius requires that applications be modified to work with its system. Still, the conflict is far from over, and other contestants may soon join in. It will be some time before we can tell if Mac users are the ultimate winners or losers in this war.

—Bruce F. Webster

LUIS DELGADO

**The contenders: the Radius PrecisionColor Calibrator (left) and SuperMac's SuperMatch Display Calibrator both calibrate monitors, but differ in their approach.**

## Next: Price Down, Power Up

Next is showing a revamped and expanded product line that includes a $4995 system. The company claims it has already taken orders for 15,000 units, and software support is coming from developers including Lotus, Adobe, WordPerfect, and others.

The $4995 Nextstation, and the Nextstation Color and Nextcube (both $7995), all have a 25MHz 68040 processor and a 25MHz 56001 digital signal processor; 8MB of RAM (12MB for the Nextstation Color); a 105MB hard drive; a 2.88MB floppy disk drive; built-in 1120-by-832 video; built-in microphone and speaker; a SCSI II and two serial ports; twisted-pair and

*(continues)*

# Why the power protection unit on the left is more expensive than the one on the right.

As you can see, the surge suppressor on the left costs a few hundred dollars less than the APC Uninterruptible Power Source (UPS) on the right. What you don't see is that it could end up costing you and your business thousands of dollars in hidden and unnecessary expenses. That's because surge suppressors protect against a disturbingly low percentage of total power disturbances.

According to Bell Labs, surges represent only 8% of the power problems that affect computers. What's more, the sags, brownouts and blackouts that make up the other 92% can be just as damaging to the hardware and software of your Macintosh as that first 8% – resulting in costly data loss, system downtime, and service costs.

That's why APC offers a selection of UPS systems for the Macintosh. Only a UPS system gives you 100% protection against the complete range of power problems that routinely affect computers and data.

And among major manufacturers, only APC offers a complete line of UPS systems *designed specifically* for the Macintosh.

In fact, we're the leading developer of power protection equipment for microcomputers – servicing hundreds of the nation's largest corporations.

APC UPS protection helps you ensure the cost efficiency of your business applications and the integrity of your creative work.

And because power disturbances can potentially do more damage to networked systems than to single-user systems, APC offers PowerChute UPS Monitoring software for automatic, unattended shutdown of your AppleShare file servers.

All of these benefits prompted *Macintosh Buyer's Guide* to comment, "...the APC UPS systems are indispensible...[They] represent a solid value and perform above their specifications."

No matter which Macintosh model you use, APC offers a UPS system designed to be fully compatible with it. The Model 110SE is designed for use with the Macintosh SE, SE/30, Plus, and 512 computers. For the Macintosh II family, there's our higher-rated UPS Model 370ci.

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**Circle 49 on reader service card**

**The Nextstation Color: 16 inches of 16-bit color running at 15 MIPS for $8000.**

thin-wire Ethernet; and a keyboard and a two-button mouse. The slotless, pizza box–shape Nextstation and the Nextcube both come with the 17-inch Next MegaPixel Display and on-board 4-bit video providing 4 levels of gray and 4 levels of transparency; the Nextstation Color comes with the 16-inch Next MegaPixel Color Display (a Sony Trinitron monitor) with on-board 16-bit video providing 4096 colors and 16 levels of transparency.

Next also introduced the Nextdimension, a 32-bit color video board for the Nextcube with an Intel i860 RISC-based graphics accelerator, NTSC in and out, and a C-Cube JPEG chip capable of real-time video compression. The Nextdimension sells for $3995; an accompanying Next MegaPixel Color Display costs $2995.

Next knows that hardware doesn't sell without software, and some of the software developed for the new Next machines is impressive. Lotus Improv is a multidimensional, natural language–based spreadsheet and modeling tool that may sell quite a few Next systems by itself. Other impressive software includes Knowledge Transfer's SimuLearn, a HyperCard-like system for building tutorials; and Imagine's MediaStation, a multimedia-presentation and -archiving system.

Next's system software, Nextstep 2.0, adds many features: support for multithreading; fax (an external fax modem is required); CD ROM readers; the ability to read and write MS-DOS–formatted 3½-inch disks.

The new products, prices, and sales mean that Next will be around awhile longer. Whether or not the company can turn these developments into a profitable market share remains to be seen.—**Bruce F. Webster**

## CE's New Interface

CE Software's early shareware DA DiskTop was nothing fancy, but it could do all kinds of things the Mac couldn't do on its own—things like finding files, moving or copying files while inside an application, and changing file types and creators.

CE is about to ship another product that does for the Mac interface what Apple can't quite get around to doing. Tiles is a simple application that works with MultiFinder to keep track of everything you do at your Mac and represent it all as an icon. For example, if you sit down at your Mac, open a Panorama database, launch WriteNow, and open three WriteNow files, Tiles nests icons for each application and its documents in a Project tile. Next time you start up your Mac, you can run Tiles and simply double-click that Project tile to open those Panorama and WriteNow documents. Or just clone the tile and leave it sitting on your desktop to double-click when you start the day.

You can also make tiles of QuicKeys 2.0 sequences, and arrange tiles in long strings, giving the Mac the iconic equivalent of DOS batch files. You can control how many events Tiles keeps track of and for what applications; modify icons; and sort tiles by name, how frequently they're used, and so on. If you move a file called by a tile, CEToolbox, CE's system-manager utility, will update the tile automatically.

BILL GILLETTE

**John Foster (left) and John Pence at CE's future offices. The pair have followed Tiles through several companies.**

Tiles will list for $99.95 and will include Window Cleaner, an INIT that hides windows belonging to background applications. For additional information, contact CE Software in West Des Moines, Iowa, at 515/224-1995.—**D.L.**

## Golden Triangle's Disk-Twin Offers Data Security

For applications that require a high degree of data security, Golden Triangle is offering DiskTwin, a NuBus board that, in conjunction with a second hard drive, creates a complete copy of the data on the primary hard drive. Unlike software disk-mirroring or some mirroring drive controllers, DiskTwin does not adversely affect the performance of the Mac because it does not require the system or controller to write data first to one drive and then to the second storage device.

DiskTwin works by residing on the NuBus and, when data is being written to the primary hard drive, recording it on the second drive as well. Mirroring boards usually operate by sending the same signal to two disk drives, but if the board itself fails, access to the data is lost until it can be repaired or replaced. Because DiskTwin works in addition to the Macintosh's drive controller, the user will have access to one of the two complete sets of data, even if the controller or DiskTwin should fail. Golden Triangle calls this approach *disk duplexing*.

Golden Triangle is offering DiskTwin—without a hard drive—at a retail price of $995. Golden Triangle has made arrangements with Procom and CMS Enhancements for those companies to bundle DiskTwin with some of their hard drives.

Customers who buy two of Procom's 650MB or 1GB hard drives will get DiskTwin for free. Those *(continues)*

# The Question Isn't Why Ehman Monitors Cost So Little... It's Why Apple And Radius Charge So Much.

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For those who are in the market for monitors there are a couple of choices. If you don't mind spending money on expensive labels, buy your next monitor from Apple or Radius. But, if you prefer saving money, call Ehman.

**Ehman**
***The Apple Alternative***

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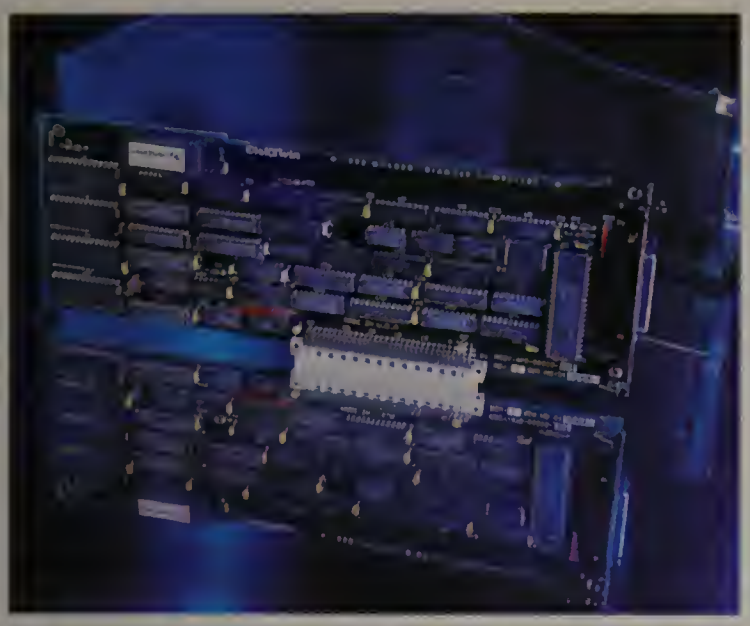
Circle 144 on reader service card



LUIS DELGADO

**The DiskTwin board works with a second hard drive to make a copy of the data on the primary hard drive.**

who buy any Procom drive ranging from 20MB to 1GB will be eligible to purchase DiskTwin for $495. CMS, which will call the product NuPlex, will offer it with its higher-capacity Platinum series of hard drives. The Platinum series includes 100MB, 130MB, 150MB, 170MB, 175MB, 200MB, 300MB, 600MB, and 1GB drives. According to CMS, its pricing was not finalized, but the cost of a Platinum drive with NuPlex should be about $300 to $400 more than that of the corresponding Platinum drive. For more information, contact Golden Triangle in San Diego, California, at 619/279-2100.—**T.M.**

## ithink, Therefore . . .

In the Dark Ages, those wishing to predict the future sought out the services of a wizard and a crystal ball. In our time, these hard-to-secure items have been replaced by a Macintosh running simulation software. High Performance Systems' Stella was among the first simulation packages available on the Mac, and now the company is replacing Stella with the more powerful ithink. (High Performance will continue to market Stella to schools.)

Although the spreadsheet is widely thought of as the tool for performing "what-if" analyses, it is not versatile enough to handle most complex simulation problems. Specialized mainframe software has existed for many years, but it requires programming in a complicated simulation language. Now, using the Macintosh and programs like ithink, it is possible to model the world's population explosion, fluctuating petroleum prices, or the growth of bacteria, with the simplicity of the Mac's point-and-click interface. By placing and connecting icons representing stocks (quantities that accumulate like cash in an account or liquid in a container), flows (quantities that move in and out like income and expenses or water flowing into or out of a reservoir), and convertors (which describe how the input changes to create an output), ithink enables you to describe a complex set of relationships—without an advanced degree in the kind of math available to engineers, physicists, and mathematicians.

Competing products offer some but not all of ithink's capability. Extend, which requires mastery of a simulation language, lacks a full integration of graphics with the simulation model. Crystal Ball makes generating and summarizing random outcomes a simple task, but your model must be constructed within a spreadsheet. ithink has taken the simulation process well beyond this. Among features setting ithink apart from its predecessor Stella are color support, full integration of graphics with the model, and new functions that permit more complex models.

ithink will list for $450. For more information contact High Performance Systems in Hanover, New Hampshire, at 603/643-9636.

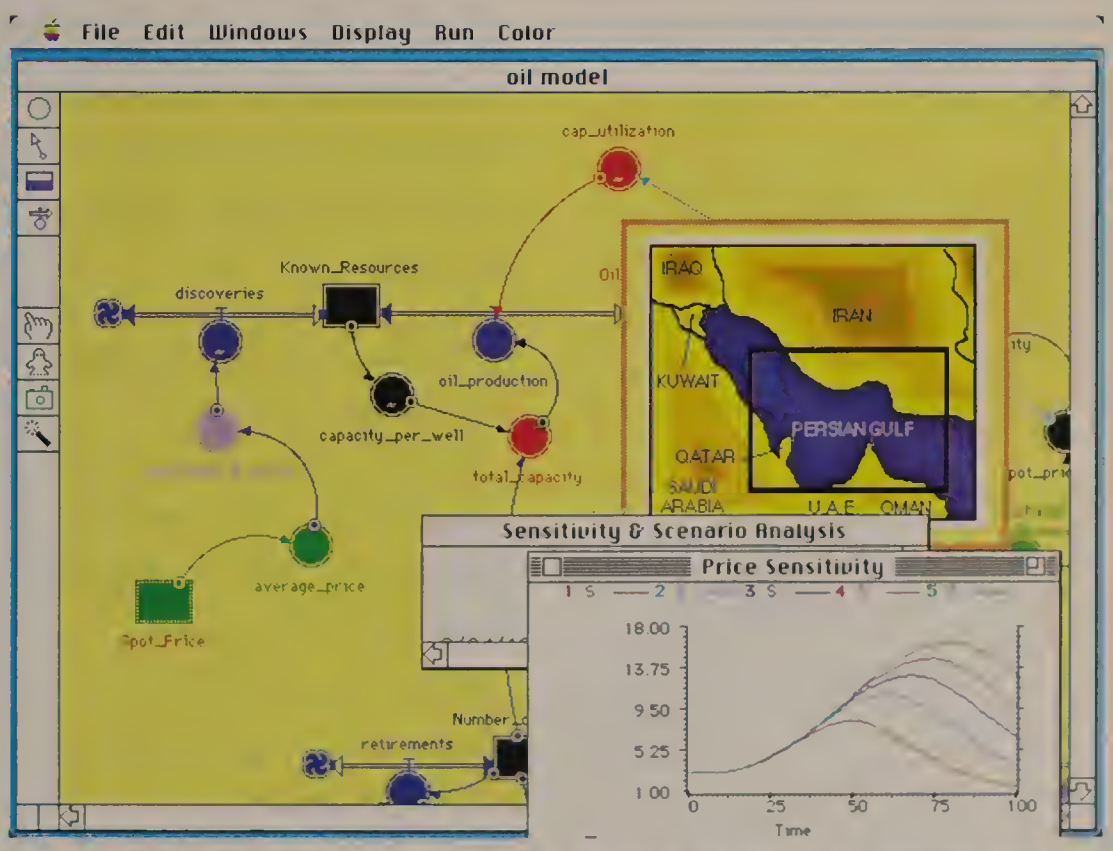
**—David Morganstein**

## The Color of Information

Well-conceived Macintosh software flattens a program's feature set to make the most complex capabilities easily accessible. Three good examples: Odesta's statistical-analysis tool DataDesk, Scitor's project-management package Project Scheduler 4, and Time Arts' high-end paint package Oasis.

A new company, Pastel Development, is finally trying to do the same with software for managing the disjointed, chaotic mass of information that goes into a day's work. Pastel Manager is essentially an unstructured

*(continues)*




**An ithink simulation of factors affecting world petroleum prices. Blocks represent stocks of money or oil, circles show logical relationships, and lines show processes.**

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MacProof. Proofreading and text-revision software for the Macintosh by Lexpertise. Now for only $195.00 (suggested retail price). PC Proof available for IBM and compatibles. For more information, contact your local dealer or call toll free 1-800-354-5656.

Requires 1MB of memory. Format compatible with: MacWrite 4.6 and 5.0, MacWrite II 1.0, Microsoft Word 4.0, MindWrite 1.0 and 2.0, PageMaker 3.0. (Requires 2MB for PageMaker.) Check with Lexpertise for further information on product compatibility. Trademarks belong to their respective manufacturers.

**Circle 183 on reader service card**

Mac Proof™ YOUR ENGLISH PROOFREADER BY LEXPERTISE

**E-Machines' QuickView Studio board lets the Mac display two full-motion video windows at the same time. It also supports a variety of special effects, including warps and wraps.**

database with a calendar front end. You create new records (they can be text items or date items) and assign them tags, which you can make up as you go along—for example, "deadline," "address," or "good hotel." Each record can have many tags, any tag can be used on many records, and you can even create hierarchical tags. You can then search for information using any combination of dates, tags, and text-retrieval.

Pastel Manager lets you display your data in many formats—for example, you can arrange a monthly calendar, your daily to-do list (in a Gantt chart, if you want), and a telephone list side by side—and save it all as a Snapshot that you can call up again later. Pastel has a wide range of printing options as well, including *virtual pages* that allow you to print more than one report—say, your appointment list and directions to meeting sites—on the same page.

**In Pastel Manager tasks can be sorted by tags and displayed as a Gantt chart (example shows Waterfront Project tasks).**

Future plans for Pastel call for other record types such as numeric and sound; multiuser scheduling; direct access to other companies' E-mail; and, through the magic of System 7.0, including files from other applications as records in a Pastel database. Pastel Manager will list for $295. For more information, contact Pastel Development, in New York City, at 212/431-3421.—**D.L.**

## Television Board Does Multiple Windows

Aiming to put a video-production studio on the Macintosh, E-Machines has designed QuickView Studio, a NuBus board that displays two full-motion TV windows simultaneously and offers a variety of special effects. The board and its software are intended for creating real-time multimedia presentations on the desktop.

The QuickView Studio board's windows show different video sources, which can be RGB, composite video, or S-VHS input in either the standard NTSC format or the European PAL format. The board's special effects include warps, wraps, 3-D rotations, and horizontal and vertical flips. The device also supports text overlays and masks for titles. Output from QuickView Studio can be imported into applications such as MacroMind Director for the creation of animations.

## VIRUS WATCH

*Current viruses, Trojan horses, and worms affecting the Macintosh community.*

### CDEF

**Type:** Virus
First listed in Virus Watch: 12/90
**Info:** Infects desktop file.
**Impact:** Nondestructive; can cause crashes.

### MDEF2

**Type:** Virus
First listed in Virus Watch: 12/90
**Info:** an MDEF (Garfield) clone.
**Impact:** Nondestructive; can cause crashes; infects both System file and applications.

### Unnamed PostScript Hack

**Type:** Trojan Horse
**First listed in Virus Watch:** 11/90
**Info:** Disables PostScript printers; requires replacing a chip on the printer's system board.
**Impact:** Destructive.

### MDEF (a.k.a. Garfield)

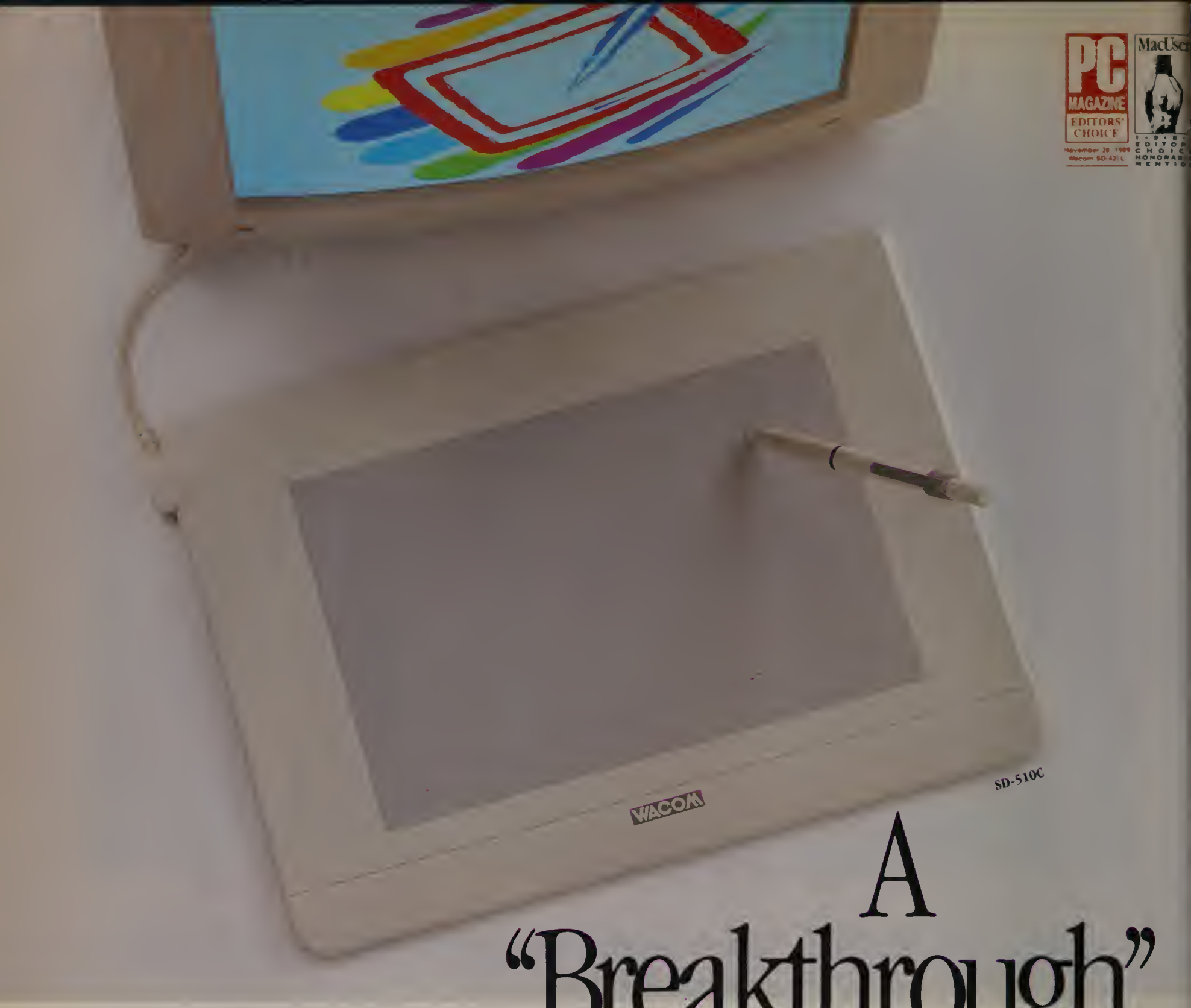
**Type:** Virus
**First listed in Virus Watch:** 10/90
**Info:** Bears no resemblance to WDEF.
**Impact:** Nondestructive. Can cause crashes; infects both System file and applications.

### Steroid

**Type:** Trojan Horse
**First listed in Virus Watch:** 10/90
**Info:** Steroid is a disk-destroying INIT circulated with the false claim that it speeds up QuickDraw on Macs with 9-inch screens.
**Impact:** Destructive.

QuickView Studio displays digital video at 16 bits per pixel and at the standard broadcast rate of 30 frames per second. The board and software are compatible with E-Machines' 16-inch and 19-inch color monitors, and with Apple's 13-inch color monitor. QuickView Studio will work with any monitor that is compatible with 32-bit QuickDraw and that also can ac-

*(continues)*




# A "Breakthrough"

## Graphic Tool for Macintosh Artists

### The Wacom cordless, pressure-sensitive stylus.

The Mac has always had great potential in graphic arts. But until now, no one has really provided a tool to unleash it. There has always been some form of mechanical trade-off imposed by input devices that inhibited artists from letting their imaginations flow naturally.

Now, Wacom introduces a totally "real" graphic tool, one that let's you interact with the Mac as intuitively as you would with a canvas. With Wacom's cordless, pressure-sensitive stylus your will is converted through manual pressure to line width, spray density, color change and other programmable effects. This allows you to create "real time" artistic images free of the artificiality and limitations of other input devices. And since the Wacom stylus has neither cable nor battery, it is also ultra-light and maintenance free.

Wacom, a leading name in computer graphics worldwide with proven man-machine interface technology, invites you to a new era in Macintosh graphics with a promise:

Once you experience it, you'll never look back.

**Wacom SD-Series Digitizers:**
• A0 to A5, square or rectangular • Surface types. standard, magnetic, electrostatic, or transparent menu panel • Pointing devices: Stroke-type, or nonstroke-type cordless stylus, pressure sensitive stylus, 4-button or 12-button cordless cursor • Driver software: ADI driver, mouse drivers, Windows drivers, Macintosh driver • Compatibility: PCs, Macintosh, and workstations.

**Performance/Specifications**
• Resolution: 1,270 lines/inch (0.02mm) • Accuracy: ±0.01 inch (±0.25mm) over entire active area • Reading speed: Max. 205 points per second • Data transfer rate: Max. 19,200 baud • Interface: RS-232C or optional GP-IB • Command set. Wacom II, MM, Bit Pad Two • Power supply: built-in (A2 to 11"×11" tables) or external (A0, A1, A5)

WACOM

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Tel: (1) 201-265-4226, Fax: (1) 201-265-4722
**WACOM Computer Systems GmbH:**
Hellersbergstrasse 4, D-4040 Neuss 1, West Germany
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# Video Production Made Easy.

Truevision's NuVista®+ is the ultimate single-slot video card for the Macintosh®. MacroMind® Director® 2.0 is the defacto standard for multimedia presentations and animinations. With this combination, professional quality video productions are easier and more affordable than ever.

## Now It's Even Easier.

Truevision and MacroMind have teamed up to create the Video Production Kit. Purchase a NuVista+ before December 31, 1990 and, you'll automatically receive a copy of MacroMind Director 2.0. Normally valued at $3,690, the Video Production Kit is priced at only $2,995—a savings of $695! It features a NuVista+ (with 1MB of high speed VRAM) along with several special Director diskettes and is ideal for 16 bit/pixel video production. You can upgrade the NuVista+ (for 32 bit/pixel productions) and receive similar savings. So see your Authorized Truevision Dealer for a demo, or call us for more information right away.

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*Sorry, this offer is good only through Authorized Truevision Dealers in the U.S. Prices quoted are suggested US domestic list prices.

MacroMind and Director are registered trademarks of MacroMind Incorporated. NuVista and Truevision are registered trademarks of Truevision Inc. If you've read this far, congratulations on your perseverance, but you should really be visiting a dealer and seeing the hot presentations of these products instead. Enjoy.

Circle 1 on reader service card

# The Image Club Graphics Typeface Library

**ATM COMPATIBLE! MAC OR PC**
The Image Club Typeface Library is now available in Adobe Type Manager™ (ATM) compatible Type 1 format for both Macintosh and Windows 3.

image club typeface library

# This Ad isn't Big Enough!

Goudy · Goudy italic · Goudy bold · Goudy bold italic
ITC GOUDY SANS®: Goudy Sans · Goudy Sans book italic · Goudy Sans bold · Goudy Sans bold italic
AMERICANA™ (ATF): Americana · Americana italic · Americana bold
BADLOC™ (IC): Badloc · Badloc Compression
BAKER SIGNET™ (VGC): Baker Signet
BALLOON (ATF): BALLOON bold · BALLOON extra bold
BAMBOO (ATF): Bamboo
BANCO: BANCO
ITC BARCELONA®: Barcelona book · Barcelona book italic · Barcelona bold · Barcelona bold italic
BASILEA™ (VGC): Basilea
ITC BAUHAUS®: Bauhaus light · Bauhaus medium · Bauhaus bold · Bauhaus heavy · Bauhaus heavy outline
BEEBOPP™ (IC): Beebopp
ITC BENGUIAT®: Benguiat book · Benguiat bold
ITC BENGUIAT GOTHIC®: Benguiat gothic book

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...OLDSTYLE®: ...y old style book · old style book italic · old style bold · old style bold italic
Bernase roman
BERNHARD TANGO™ (VGC): Bernhard Tango w/swash init
BISQUE™ (VGC): Bisque
BODONI: Bodoni book · Bodoni book italic · Bodoni bold · Bodoni bold italic · Bodoni Poster
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BOOK JACKET™ (VGC): Book Jacket italic
ITC CENTURY® CONDENSED: Century book cond. · Century book cond italic · Century bold cond · Century bold cond italic
CENTURY OLDSTYLE: Century oldstyle · Century oldstyle italic · Century oldstyle bold
CENTURY SCHOOLBOOK (ATF): Century schoolbook · Century schoolbook italic · Century schoolbook bold · Century schoolbook bold italic
CHAMPAGNE (IC): Champagne
ITC CHELTENHAM®: Cheltenham book · Cheltenham book italic · Cheltenham bold · Cheltenham bold ital · Cheltenham outline · Cheltenham outline shad · Cheltenham contour
ITC CHELTENHAM® CONDENSED: Cheltenham book cond · Cheltenham book cond italic · Cheltenham bold cond · Cheltenham bold cond italic
CHROME BUMPER™ (IC): CHROME bumper

CITI (IC): Citi light · Citi bold
CLAREDON (IC): Claredon · Claredon book
ITC CLEARFACE®: Clearface regular · Clearface italic · Clearface bold · Clearface bold italic · Clearface outline · Clearface outline shad · Clearface contour
COMIC BOOK™ (IC): C... · COM... · Co...
Nov... book · Nov... · Nov... · Now...
Itali... · Italia medium · Italia bold
COPPERPLATE GOTHIC™ (VGC): ABCDE copperplate gothic light · ABCDE copperplate gothic
ITC KABEL®: Kabel book · Kabel medium · Kabel demi · Kabel bold · Kabel ultra · Kabel outline · Kabel contour
KAUFMANN SCRIPT™ (ATF): Kaufmann Script · Kaufmann Script
EUROSTIL EXTENDED (IC): Eurostil ext · Eurostil bold ext · Eurostil ext. outline · Eurostil bold ext. outline
ITC NEWTEXT®: Newtext light · Newtext light italic · Newtext book · Newtext book italic · Newtext regular · Newtext regular italic · Newtext demi · Newtext demi italic

AASE™ (VGC): Aase light · Aase light · Aase · Aas...
Fin... · Find...
Firen...
Ronda light · Ronda · Ronda bold
...square · ...qua...
Franklin ... · Franklin ... · ...klin · ...klin · ...klin · ...klin gothic heavy italic
Franklin gothic outline · Franklin gothic outline shad. · Franklin gothic contour
FRIZ QUADRATA™ (VGC): Friz quadrata · Friz quadrata bold
FUTURA® (FTN): Futura light · Futura light oblique · Futura book · Futura book oblique · Futura medium · Futura medium oblique · Futura demi bold · Futura demi bold oblique · Futura bold · Futura bold oblique · Futura extra bold · Futura extra bold oblique
FUTURA® CONDENSED (FTN): Futura medium cond. · Futura medium cond oblique · Futura demi bold cond · Futura demi bold cond oblique · Futura bold cond · Futura bold cond oblique · Futura extra bold cond · Futura extra bold cond oblique

ITC GORILLA...
GRAPHIX SHADOW
ITC GRIZ...
...so... · ...Grotesque
hairpin · hairpin hairline
HARRY™ (VGC): Harry thin · Harry plain · Harry fat
HEADLINER (IC): HEADLINER · HEADLINER outline
HALLMARKE (IC): Hallmarke light · Hallmarke light italic · Hallmarke black · Hallmarke black italic
HALLMARKE CONDENSED™ (IC): Hallmarke light cond · Hallmarke light cond. italic · Hallmarke regular cond · Hallmarke regular italic · Hallmarke bold cond · Hallmarke bold cond italic · Hallmarke black cond. · Hallmarke black cond. italic
ITC FAT FACE®: FatFace
ITC FENICE®: Fenice regular · Fenice regular italic · Fenice bold · Fenice bold italic

INDUSTRIAL PRESS™ (IC): INDUSTRIAL
ITC ISBELL®: Isbell book · Isbell book italic · Isbell bold · Isbell bold italic
... (IC): ...nz · ...nz grey
...HAIRLINE™ (VGC)
ITC MACHINE®: MACHINE · MACHINE bold
MAXIMUS™ (VGC)
Mezz... bold
MICROGRAM normal · ABCDE microgram bold · ABCDE microgram outline · ABCDE microgram bold outline
MICROGRAM EXT & COND (IC): MICROGRAM cond · ABCD microgram ext. · ABCD microgram bold ext · MICROGRAM cond outline · ABCD microgram ext. outline · ABCD microgram bold ext.
ITC MILANO ROMAN®: Milano Roman
MINI PICS™ (IC): mini-pics
MISTRAL: Mistral
ITC MIXAGE®: Mixage book · Mixage book italic · Mixage bold · Mixage bold italic · Mixage black · Mixage black italic
ITC MODERN NO. 216®: Modern no 216 light · Modern no 216 light italic · Modern no 216 bold · Modern no 216 bold italic

Modern no 216 heavy · Modern no 216 italic
MURRAY HILL™ (ATF): Murray Hill · Murray Hill Bold
NEON™ (IC): NEON
ITC NEON®: ITC NEON
NEULAND: NEULAND
PALLADIA (IC): Palladia · Palladia italic · Palladia bold · Palladia bold italic
ITC PANACHE®: Panache · Panache italic · Panache bold · Panache bold italic
PAPER CLIP™ (VGC): PAPER clip · PAPER clip outline · PAPER clip solid
PARK AVENUE (ATF): Park Avenue
PIANO™ (IC): Piano light · Piano bold
ITC PIONEER®: PIONEER
PLAYBILL: Playbill
POINTILLE™ (VGC): POINTILLE
IVY LEAGUE™ (VGC): IVY LEAGUE · IVY LEAGUE open
COMMERCIAL SCRIPT (ATF): Commercial Script
COMPACT (IC): Compact light · Compact · Compact bold
COOPER BLACK (ATF): Cooper black · Cooper black italic
FOLIO® (FTN): Folio light · Folio medium · Folio bold · Folio extra bold
FRAKTUR: Fraktur

SALTO: Salto
SAVAGE™ (IC): Savage
SCANNING (IC): SCANNING
SCOTFORD UNCIAL™ (VGC): SCOTFORD uncial
ITC SERIF GOTHIC®: Serif Gothic regular · Serif Gothic bold · Serif Gothic black · Serif Gothic bold outline
TH ALPHABET SOUP™ (VGC): T.H. ALPHABET soup
THOR™ (VGC): Thor
THUNDERBIRD: ABC thunderbird
ITC TIEPOLO™: Tiepolo book · Tiepolo book italic · Tiepolo bold · Tiepolo bold italic · Tiepolo black · Tiepolo black italic
ITC TIFFANY®: Tiffany light · Tiffany light italic · Tiffany medium · Tiffany medium italic · Tiffany demi · Tiffany demi italic · Tiffany heavy · Tiffany heavy italic
ITC TOMS ROMAN®: Tom's Roman
TOO MUCH™ (VGC): TOO MUCH opaque · TOO MUCH clear · TOO MUCH shadow
TRIUMPH (IC): Triumph · Triumph italic · Triumph bold · Triumph bold italic
UNIFORM™ CONDENSED (IC): Uniform 47 · Uniform 48 · Uniform 57 · Uniform 58 · Uniform 67 · Uniform 68 · Uniform 39 · Uniform 49

### 600 Typefaces

Too many fonts for one page! This is the Image Club Typeface Library. We've developed 600 licensed typefaces in Mac & PC format for use with any PostScript® printer. Fonts are available on diskettes, on the LetterPress™ CD ROM (which contains our entire library of over 600 typefaces), or on the Art+TypeVendor™ CD ROM.

### Desktop Type Store

The Art+TypeVendor CD ROM uses a special process to unlock typefaces and clip art from the CD ROM as they are required. The Image Club Art+TypeVendor costs just $99 and includes 20 fonts and 1 volume of ...Art™ clip art. Buying additional fonts or clip art from the Art+TypeVendor is as easy as making a toll free phone call. Image Club will provide an access key that immediately unlocks the fonts or clip art images from the CD ROM. With the Art+TypeVendor you'll never miss another deadline waiting for a font to arrive.

### Macintosh Version

The Image Club Typeface Library includes both Type 1 & Type 3 PostScript® fonts guaranteeing compatibility with virtually any Macintosh application including Adobe Type Manager™. With ATM™ you can have crisp screen fonts at any size and print Image Club fonts on non-PostScript® printers such as an ImageWriter or a LaserWriter IISC. Our fonts also include outline artwork files. Customize individual characters with Adobe Illustrator® or Aldus FreeHand™ to create unique type based logos and designs.

### PC Version

The Image Club Typeface Library PC is compatible with Ventura Publisher®, Aldus PageMaker® for Windows, Microsoft® Word for Windows, CorelDraw™, Adobe Type Manager™ for Windows and most other Windows applications. Use Image Club typefaces with any PostScript® printer or any non-PostScript® printer such as an HP LaserJet. Please note that either Adobe Type Manager™ for Windows or CorelDraw are required to use Image Club PC format typefaces with non-PostScript® printers.

### Prices & Discounts

Whether you buy Image Club fonts individually on diskette, on the Art+TypeVendor CD ROM, or the entire library on the LetterPress CD ROM, our pricing and discount schedules make it easy

**EACH FONT: $25.** Minimum purchase $50.
*Example: The ITC Fenice typeface family* contains four fonts. 4 fonts x $25 per font = $100.*
**Please note that typeface families cannot be split up.*

**DISCOUNTS:**

| | | | |
|---|---|---|---|
| 10 - 30 | fonts 20% off | 131 - 210 | fonts 35% off |
| 31 - 70 | fonts 25% off | 211 - 300 | fonts 40% off |
| 71 - 130 | fonts 30% off | | |

**CD ROM:**

| | |
|---|---|
| LetterPress™ CD ROM | $3999 |
| ** includes all 600 fonts; available for Macintosh only* | |
| Art+TypeVendor™ CD ROM | $99 |
| **includes 20 fonts & 1 volume of DigitArt clip art; Macintosh only* | |

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...e Club Graphics Inc. Suite 5 1902 Eleventh Street SE Calgary Alberta Canada T2G 3G2 Phone 403 262 8008 Fax 403 261 7013 AppleLink CDA0573

cept 13.33MB of data per second. The board also functions with 8-bit display systems.

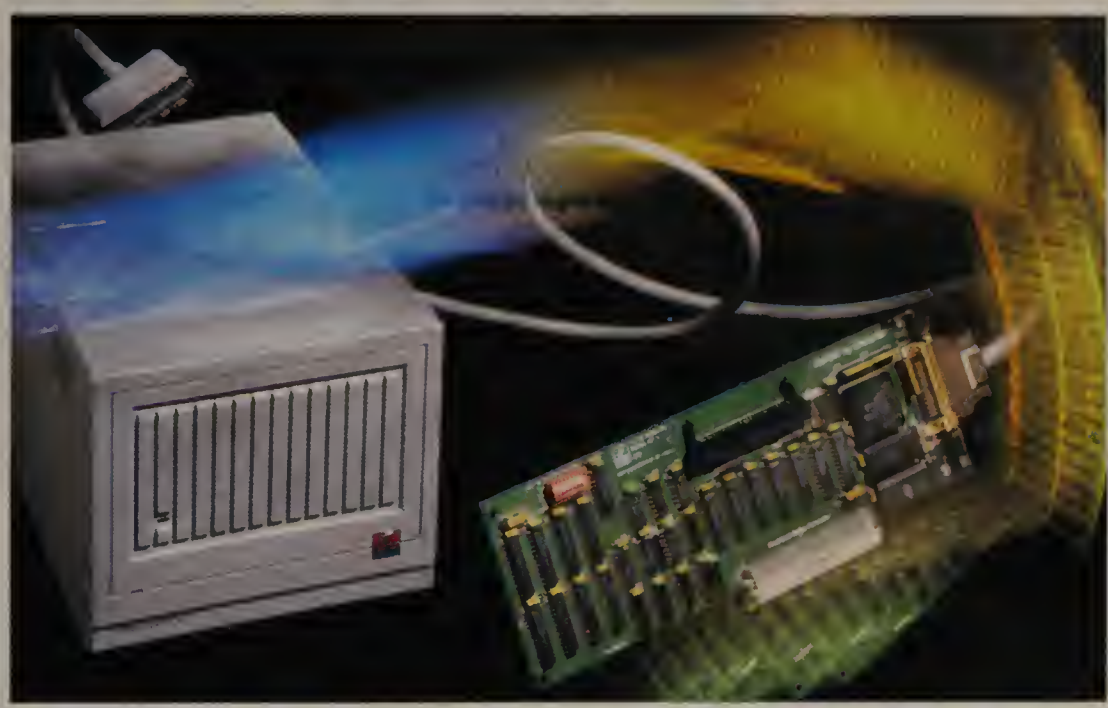
E-Machines has slated shipment of QuickView Studio for the fourth quarter. The NuBus board, software, and cables for S-VHS and composite-video input will carry a list price of $2495. For more information, call E-Machines in Beaverton, Oregon, at 503/646-6699.—**T.M.**

## MicroNet Offers SCSI-2 Controller, Fast Drives

MicroNet Technology has introduced fast hard drives and a SCSI-2 controller that together offer the greatest speed of any hard drive subsystem for the Macintosh, the company says. The heart of the new subsystems, called the Micro/Sync series, is the Micro/NuPort, a SCSI-2 controller based on an NCR chip set. SCSI-2 offers significantly higher transfer rates than current SCSI, but has not yet been completely finalized as a standard. MicroNet says it does not expect that to be a problem, as it considers the SCSI-2 specification to be essentially completed.

For its fastest subsystem, called the SB-644NP, MicroNet will combine the Micro/NuPort synchronous drive controller with a 644MB 5¼-inch hard drive made by Imprimis. The Imprimis drive has an average access time of about 18ms and a data-transfer rate of 24MHz. Now available, the SB-644NP will have a list price of $7895.

MicroNet has also developed a set of two of the 644MB drives spliced together to form a single 1288MB logical volume. To be called the SBT-1288NP, the subsystem can also be divided into 36 partitions. Because the SBT-1288NP uses an overlapped seek algorithm, it offers an average access time of about 6ms and a data-transfer rate of 3.3MB per second. The SBT-1288NP began shipping in August at a list price of $15,190. For further information, call MicroNet in Irvine, California, at 714/837-6033.—**T.M.**



TOM GIBSON

**MicroNet's SB-644NP combines a fast SCSI-2 drive controller with a 644MB hard drive from Imprimis. The drive transfers data at 24MHz; average access time is 18ms.**

## TI Printer Races at 16 Pages per Minute

At the end of October, Texas Instruments announced a low-cost PostScript laser printer that cranks out up to 16 pages per minute. Called the microLaserXL, the printer incorporates a Sharp print engine and a TI controller with a 12.5MHz 68000 processor. The controller also includes a *bit blitter*—hardware that helps move the data around faster so that processing time is less of a limiting factor.

When operating on an AppleTalk network (using an optional AppleTalk interface), the microLaser XL can automatically switch between printer emulations using a protocol that TI developed in conjunction with Adobe. To change the emulation, the user types in an escape sequence or batches an ASCII file that's sent to the printer before the document file. Currently the printer supports Diablo, ProPrinter, and HP PCL emulations.

The microLaser XL produces the usual 300-by-300-dpi resolution. It comes with a 250-sheet paper-feed tray and can accommodate an optional 500-sheet tray and an optional envelope feeder. The standard tray can hold either letter- or legal-size paper. When the standard S-shaped paper path is selected, the pages come out facedown on top of the printer. For less curling, or for heavier stock, transparencies, and envelopes, there is also a straight-through paper path with an extendable support that holds the printed pages.

The new print drum is rated to last for 60,000 pages, the developer for 30,000 pages, and the toner for 6000 pages. Longer life for the consumables means you won't have to change them constantly, despite the higher speed of the printer.

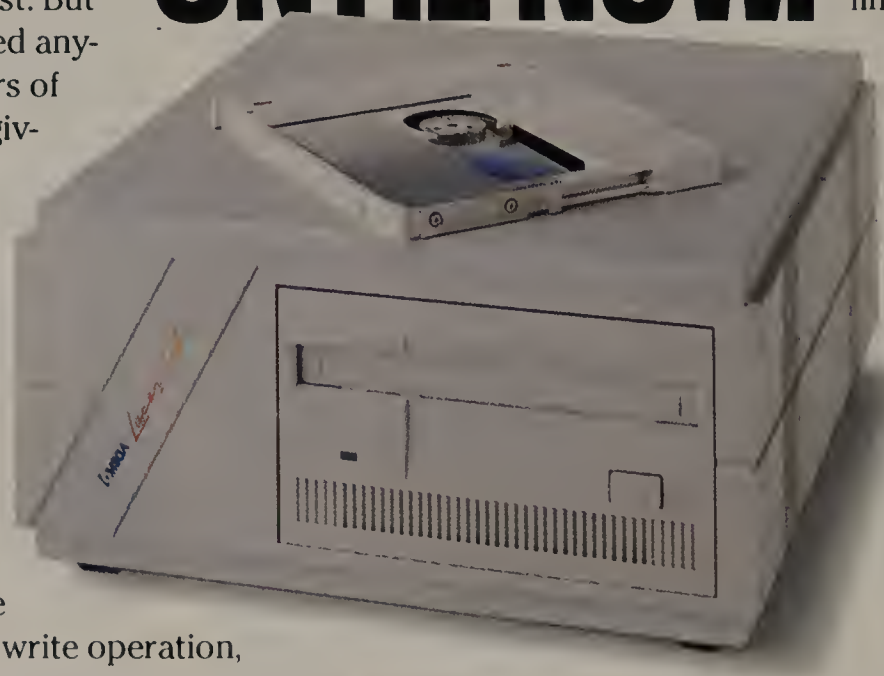
TI expects to ship the microLaser XL in November or December. The basic system with 1.5MB of RAM, Adobe Type Manager, parallel interface, and 17 fonts will be $3499. A microLaser XL with 35 fonts and Adobe PostScript will be $4599. The printer also includes two font-cartridge slots. TI says it intends to offer a SCSI interface option so users can add a hard drive for spooling and for downloadable fonts. For more information, call Texas Instruments in Austin, Texas, at 800/527-3500.—**T.M.**

*(continues)*

**Texas Instruments' microLaser XL is a 16-pages-per-minute laser printer available with or without PostScript.**

# OPTICAL STORAGE HASN'T LIVED UP TO IT'S PROMISES EITHER.

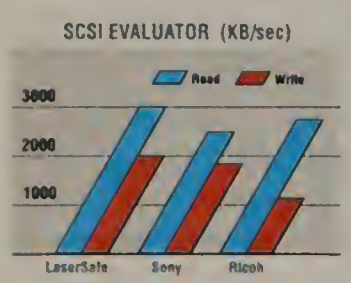
# UNTIL NOW.



Promises. Promises.

Magneto optical drives have failed to deliver in the past. But you won't be disappointed anymore. Because the makers of Bernoulli® products are giving you the MO you've been waiting for. The Iomega® LaserSafe.™

With the new LaserSafe, a fast MO is no longer an optical illusion. In addition to a 256KB caching system, LaserSafe uses a technique called "asynchronous write" that frees the Mac from waiting for the write operation, and greatly increases the throughput. This Iomega first gives LaserSafe outstanding speed. The difference is clearly visible.




LaserSafe conforms to ISO standards, making it fully compatible with all major MOs, so you can buy or access disks from just about anywhere.

LaserSafe is a 650MB optical drive that's easy to use, too. Its intuitive software lets you partition disks for easier file management. And it's the first MO to give you off-line disk formatting, saving you at least 40 minutes per disk.

LaserSafe was designed with an extraordinary attention to detail. Its sealed mechanism and positive airflow filtration set the industry standard for data integrity. And it has convenient external switching—no panels to open, no resistors to remove, no hassles.

Above all, LaserSafe is made by the company that wrote the book on removable storage, with an installed base of over 625,000 drives and a 98-percent customer satisfaction rate. A company that will be there to support you in the future.

So get the rest of the LaserSafe picture. **Call 1-800-777-6649 for free literature** and specs (not the X-Ray kind). Look into it today. Because what you're really looking into is the future of optical storage.

LaserSafe.
STORAGE SOLUTIONS BY IOMEGA

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Circle 260 on reader service card

STEVEN MECKLER

**Professor Richard Greenberg (left) talks with Sunnyside High School students about image processing.**

## Seeing Is Learning

Is a picture still worth a thousand words? More so than ever, according to Richard Greenberg, professor of planetary sciences and education at the University of Arizona. Image processing software now available for personal computers can manipulate photographs, convert complex scientific data to visual form, and bring out the hidden features in both types of imagery.

"Images convey information to the brain orders of magnitude faster than anything else," Greenberg argues. "So why not use them to teach?" With a $600,000 grant from the National Science Foundation and $157,000 worth of hardware donated by Apple, Greenberg and his colleagues, Robert Strom and Steven Croft, have launched an experimental program to use imagery and image processing software to teach high school science.

Last summer, they taught 30 handpicked high school teachers how to use the imaging software on the Mac IIx, just as it is used in planetary science, astronomy, earth science, and biomedical research. The teachers learned how to change contrast and color to bring out hidden features of images; to stretch, move, and copy pieces of an image; to measure the length, altitude, and angle of image features; and to filter the image to bring out shadows or smooth it to eliminate distracting information.

In September, the group of teachers returned to their classrooms equipped with Macs and with CD ROMs full of data and imagery contributed by NASA and by University of Arizona scientists. The contents of the discs ranged from images of the solar system to images of chromosomes in the nucleus of a cell. The teachers are now showing their students how to animate images of a rat's beating heart; how to hunt for asteroids near earth in images collected by the Spacewatch camera at Kitt Peak, Arizona; and how to use the image processing system to satisfy their own curiosity. Because they are using data and imagery not yet fully analyzed, the students could even discover something that professional scientists have not yet seen.

"It's a way to seduce kids into math and science," says Greenberg, "because image manipulation at its base is a mathematical operation. They may not be thinking about math in the beginning, but as they manipulate images, they will start thinking in mathematical terms."

All fine and dandy for suburban kids in wealthy schools full of computers, right? Wrong. The majority of students involved in the project are in Arizona's and New Mexico's rural and city schools, which are attended by many Hispanic and Native American children. Though Professor Greenberg believes that many kids are visually oriented, he especially wants to reach those students who, because of language or cultural background, respond more quickly to imagery than they do to more conventional language-based learning.

The image processing software being used in this experiment is Image, a public-domain program developed by the National Institutes of Health. It requires a color system with at least 4MB of memory. For further information, contact Richard Greenberg, at 602/621-6940 or 602/621-7821.—**Ann Garrison**

## Draw by Numbers

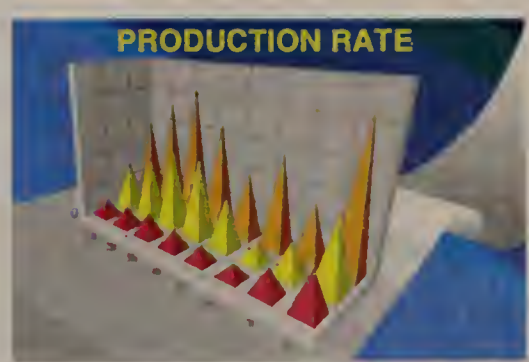
Visual Business Systems got a bad start in the Macintosh market with Visual Business No. 5, a presentation graphics package whose lack of planning and presenting tools made it easy prey for More II and Persuasion. Now the company is reentering the Mac arena with GraphMaster, a full-featured graphing package that incorporates VB No. 5's design tools and a number-crunching worksheet to use while graphing.

GraphMaster's 256-columns-by-2500-rows table imports data in many formats, including native Excel 2.2. It can calculate standard deviations and running sums, and reference other cells in formulas; formulas can be saved for use in other graphs.

GraphMaster can create a wide range of 2-D and 3-D graphs, including contour, double-y-axis, and polar graphs. You can use images and icons in place of bars to create pictograms; overlay charts or show several charts side by side; apply 2- or 3-color ramps to any object; and set axis scales, tick marks, legends, and labels. Graphs can then be ungrouped and manipulated like PICT objects. All formatting can be saved in a library to apply to other data sets.

GraphMaster will list for $295. For more information, contact Visual Business Systems in Atlanta at 404/956-0325.—**D.L.**

*(continues)*




**GraphMaster creates 3-D charts with pyramids or pictograms as well as ordinary bars.**

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MicroNet is proud to offer the fastest rewritable optical disk system available.

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A great deal of attention has been paid to reliability. As a result the Canon MO has become a reality far in advance of its time. The subsystem has been designed to work perfectly under various operating conditions, employing a unique air flow and dust filtration system.

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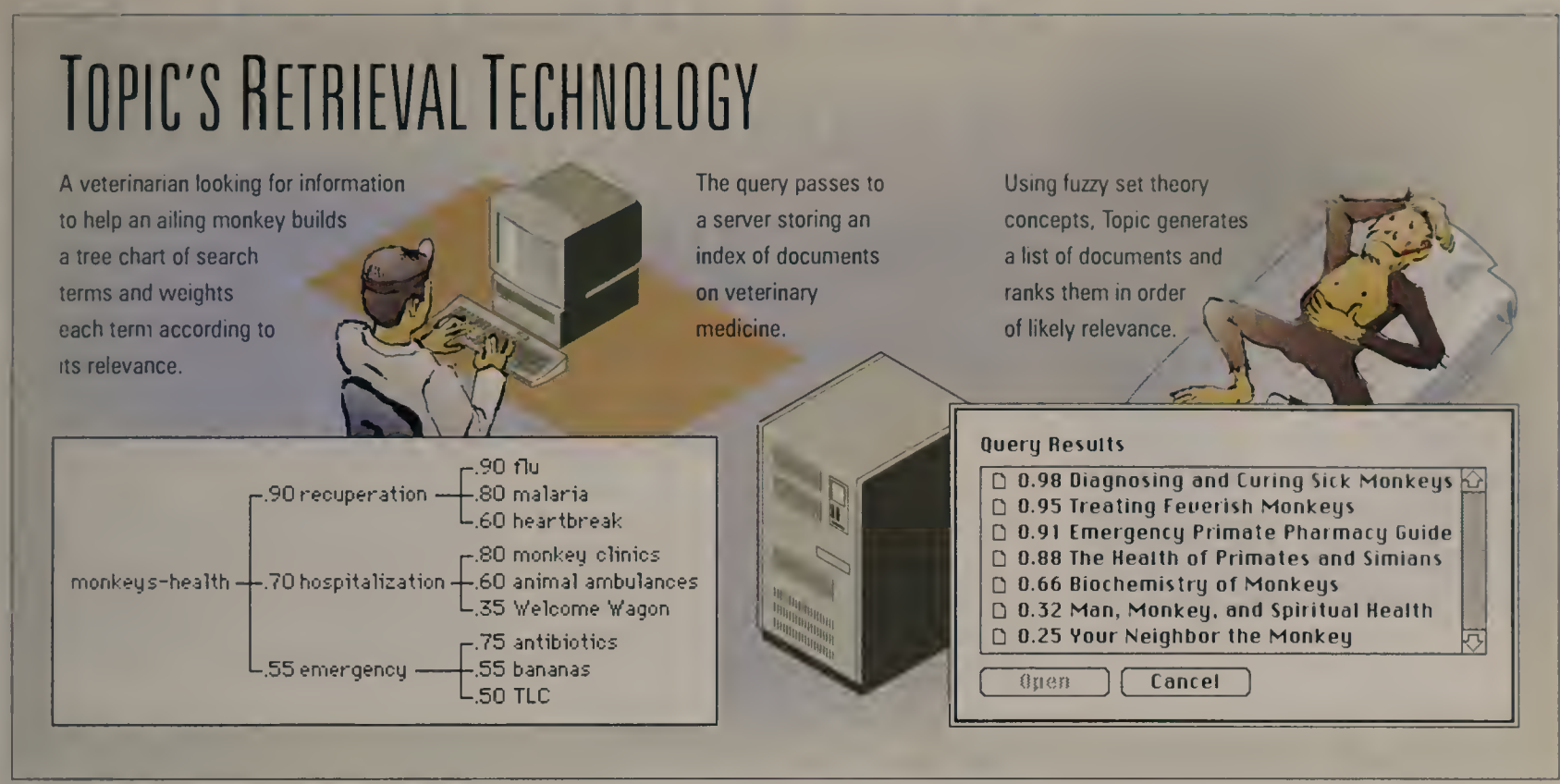


## The Hot Topic

Big corporations, newspapers, universities, and other organizations are awash in oceans of computerized information, most of it a hopeless mess. The data is collected from many sources; entered at random; never organized or cataloged; and distributed across a range of applications, computers, and operating systems.

Verity's Topic text-search-and-retrieval system is designed to find information in enormous quantities of computer files, using a technique that Verity calls concept retrieval. Other search methods require learning a special search language or combining a series of *AND*s, *OR*s, and *NOT*s, in Boolean statements. In concept retrieval, the user creates a tree chart of search terms and weights each word's importance; Topic uses the ranking to sort found documents by importance or ignore documents below a user-definable threshold. Filters extract text from most document formats and display it for users who don't have the original applications; and queries can be saved, fine-tuned by experts, and distributed to less-skilled users in a big organization.

Topic uses a client-server architecture in which each server—each machine available for other machines to search on a network—indexes every word in all the files it stores. Users can attach searchable text notes to images, sounds, and other nontext files to make them available for Topic searches. Machines can be both clients and servers, but for the Mac and DOS, Verity has only client software; server software is available for OS/2, UNIX, and VAX/VMS.

Topic has several extra features: Topic HyperLink lets users create hypertext links between documents, Topic Real-Time analyzes information received in any electronic format—news wires, stock quotes, electronic mail—and shuttles the information to users whose search queries are appropriate; Topic SQL-Bridge provides access to relational databases such as Oracle, Sybase, Ingres, and Informix.

To operate, Topic requires a file-sharing network. Retrieval client software for the Mac lists at $695; full server-client configurations range from $15,000 to $150,000. For more information, contact Verity in Mountain View, California, at 415/960-7600.
—**Jonathan Cassell**

## NetWare Now Supports AppleTalk Phase 2

For those who want better access to DOS or OS/2 files over a network, Novell has added support for AppleTalk Phase 2 to its NetWare for Macintosh, the software bridge to its NetWare network operating system. NetWare for Macintosh 2.0 now links to IBM PC–based servers over Ethernet and Token Ring networks. The software includes a DA that lets you do more server administration from a Mac. You can now set security levels for files and folders, view print queues, and control printing. NetWare for Macintosh is also now compatible with AppleTalk Filing Protocol. Another feature lets you store files and folders on a 386-based server.

NetWare for Macintosh 2.0 started shipping in September. It requires Novell's Netware 2.15 network operating system. U.S. customers who bought NetWare 2.15 after August 1, 1990, can get NetWare for Macintosh 2.0 for free by calling 800/873-2831. For those who bought NetWare 2.15 before August 1, the update cost is $200. For more information, call Novell in Provo, Utah, at 801/379-5900 or 800/453-1267.—**T.M.**

## Calendar Cornucopia

A flood of calendar and group-scheduling utilities is upon us: Alarming Events, CalenDAr, Planisoft, and Pastel Manager are joining updates of Smart Alarms and MyTimeManager. AgentDA stands apart from this group: it is not a reminder program like

*(continues)*

*Randall D. Smith, President of F.M.I., Inc. invites you to a unique learning experience to be held in your area.*

# How I Discovered the *Ultimate* Macintosh Learning Experience

The true story of someone who wanted to learn how to use the Macintosh in business ... and how he almost went crazy doing it.

A few years ago I bought a new Porsche 911. As I was reading through the literature I came across an interesting statement. It said: "the only limitation this automobile has is the driver!"

I must admit that I felt the same way when I bought my Macintosh computer. I was like a lot of first time owners in that I never read the manuals. I simply popped in the disks and figured out the basics on my own. After having used an IBM for three years I was thrilled to be able to accomplish the Mac basics without taking a six month Lotus course!

Over the next few months I happily used my Mac for letters, simple spreadsheets, check books, a few graphics, and for games. But as a business owner, way in the back of my mind, I knew that there was a whole lot more the computer and the software could do if they just had someone else behind the mouse.

I realized I needed *training* to get the most out of my computer. I first tried reading the manuals. At some point in school they convinced me that I'm a fairly bright fellow. But after nights of reading manuals I simply didn't understand what I was reading.

My next step was to visit my local Apple dealer for help. He was friendly enough, but made it fairly clear that his interest was in *selling* computers, not *teaching* me how to use them. He did mention however, that there was some training available at $75 per hour. I had already paid for one college education and didn't really have the budget for another!

Next I subscribed to all of the Mac Magazines. Most (including this one) were very interesting. After a while though, I found myself reading the *ads* more than the *articles*. I wasn't interested in advanced graphics, HyperCard stacks, or MS-DOS connectivity. It seemed like more and more of the articles were written to the advanced user - which was definitely not me.

My last resort was a Mac user group. These were great people who were extremely bright and could quote the electrical diagram of the Mac backwards and forwards. But the group was too advanced for me. I was stuck!

In marketing, you are taught to "find a need and fill it". I definitely saw a need for good, practical instruction on the Mac for the *rest of us*. I decided to provide the answer for Mac users myself. In January 88 we presented the very first MacAcademy. Since then we have had tremendous response. MacAcademy boasts many unique features: **Instructors:** Instead of sales people or programmers we feature only top business executives who use the Mac daily in their businesses. **Format:** Two full days of instruction on the Mac, Excel, Word, FileMaker, Works, PageMaker, and HyperCard. **Schedule:** Attendees can design their own personalized schedule by choosing between 18 different, 2 hour workshops. **Price:** While others charge up to $1200 for workshops, we offer two full days for only $249. **Location:** MacAcademy is held in top hotels in business centers across the U.S. **Emphasis:** MacAcademy places training emphasis on techniques and *business* applications of the featured software.

**The Results**. Over 30,000 people have attended MacAcademy. On a scale of 1 to 5 they have given the experience a 4.7. Companies who have attended include General Electric, Kodak, G.T.E., M.I.T., Honeywell, N.A.S.A., Boeing, Citicorp, Motorola, Mobil Oil, Gillette, TRW and 2000 additional corporations. Are they happy with MacAcademy? The City of Anaheim sent one employee to our first workshop and ten to our second. We have had over 15,000 people volunteer to be references for those considering attending.

What about you? I'd like to personally invite you to attend MacAcademy. This year we will present our dynamic 2 day workshop in over 100 cities in the United States. For a schedule of our upcoming workshops call: 800-527-1914. Profit from the Ultimate Macintosh Learning Experience.

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Circle 168 on reader service card

JON GILBERT FOX

**Benoit Paquin (left) and Gilles Fortin, two key minds at Team-Building Technologies.**

CalenDAr or Alarming Events, and it has an unusually flexible and carefully thought-out scheduling window.

With two quick clicks in AgentDA you can set how many days of the week and how many weeks are displayed (up to five weeks), or ⌘-click to zoom in on a single day. You can mark completed tasks, select all uncompleted tasks with a command, and drag tasks from day to day. Unfortunately, you can't select all of a single day's uncompleted tasks to drag over to tomorrow. AgentDA also cannot generate recurring events or split a single event across days. It can search on a wide range of criteria and print schedules in many formats, using Excel's metasymbols to include dates and page numbers in headers and footers.

AgentDA is part of a series of calendar, group-scheduling, and project-management tools from the French-Canadian company Team-Building Technologies. The next product planned is TeamSynchro, a multiuser calendar with support for splitting and interrupting tasks, scheduling facilities, and checking for time conflicts. It will provide password security as Planisoft does and display several users' calendars side by side (unlike Planisoft, which can show only one). TeamSynchro will also support domains, that is, groups such as committees, and let individuals manage time commitments across several domains.

AgentDA lists for $139; pricing for TeamSynchro hasn't been set. For more information, call Team Building Technologies in Outremont, Quebec, Canada, at 514/278-3010.—**D.L.**

## News Survey: Desktop Publishing

For this month's survey we asked our readers how much they or their organizations use desktop publishing. Not much to our surprise, nearly 80 percent of responding readers do some type of DTP, supporting the received wisdom that casts the Mac mainly in the role of a publishing engine.

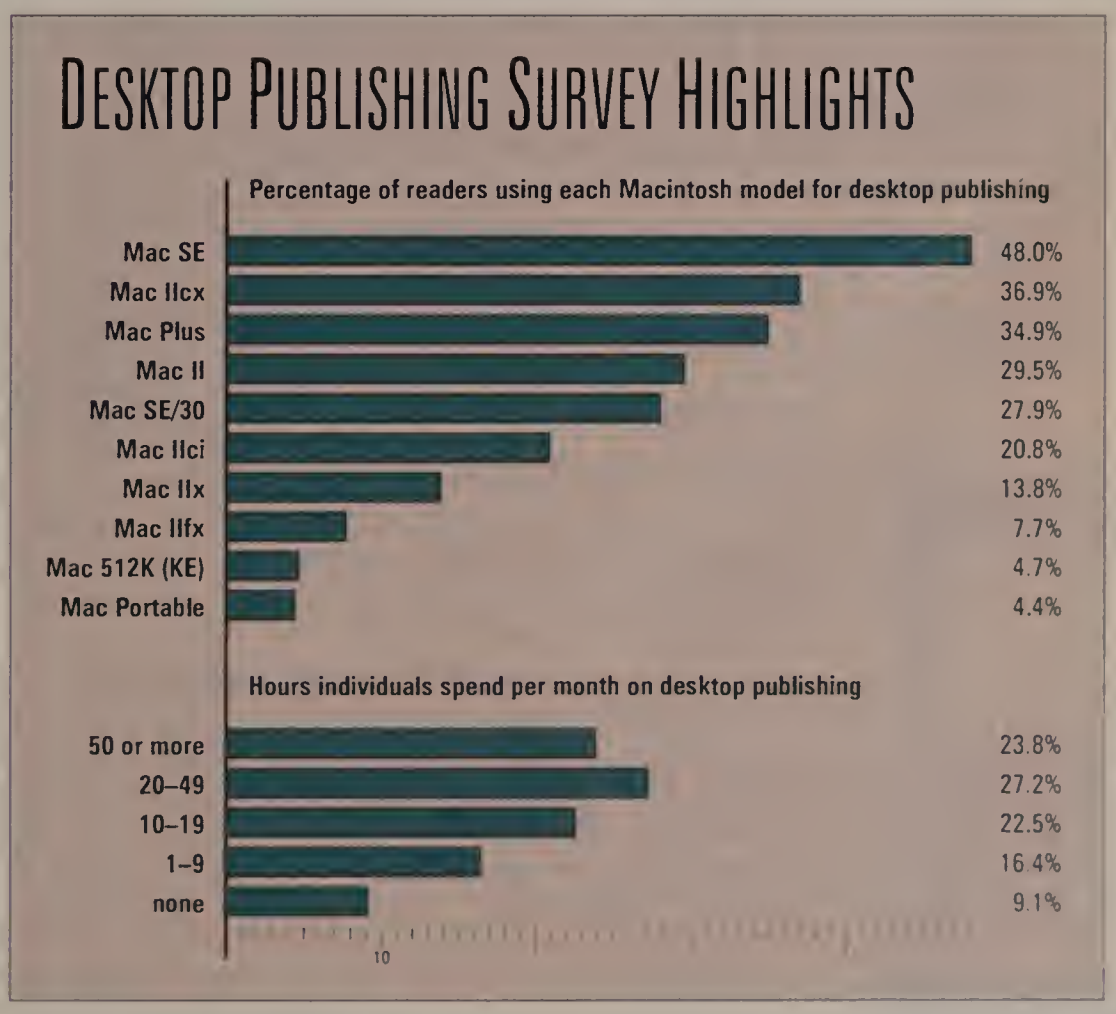
Of those DTP-using readers, 48.7 percent say they put out newsletters, 45.5 percent produce brochures, 11.3 percent publish books, 10 percent make catalogs, and 8.2 percent create magazines. 40.5 percent of DTPers say they have other uses. (The figures add up to more than 100 percent because the question allowed multiple responses.)

51 percent of readers who desktop publish say that in an average month they personally spend at least 20 hours doing DTP. That breaks down into 27.2 percent of DTPers reporting 20 to 49 hours, and 23.8 percent putting in 50 hours or more.

For art, 62.8 percent of the respondents said they include charts or graphs, 57.7 incorporate line art, 53 percent use clip art, and 34.9 percent publish photographs. As you might expect, 80.9 percent produce black-and-white output, while 25.5 percent print in two colors, 9.4 percent use three colors, and 20.5 percent do four-color printing. (Multiple responses again were possible for both of the above questions.)

Given the number of readers who say they desktop publish in black and white, it's not so surprising that 48 percent say they use an SE. The next most popular system is the IIcx at 36.9 percent, with the Mac Plus close behind at 34.9 percent. (Once again, multiple answers were permitted.)

For output, 81.9 percent of respondents say they use a standard laser printer at 300 dpi, 21.5 percent say they print on an imagesetter at about 1200 dpi, 10.4 percent use a high-resolution imagesetter at about 2500 dpi, and 8.4 percent say they produce their hard copy on a high-resolution laser printer at about 400 dpi.—**T.M.**



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A MacWarehouse Memory Expansion Kit will dramatically increase the power of your Mac. And our fast, reliable, overnight service will have your Kit in your hands tomorrow!

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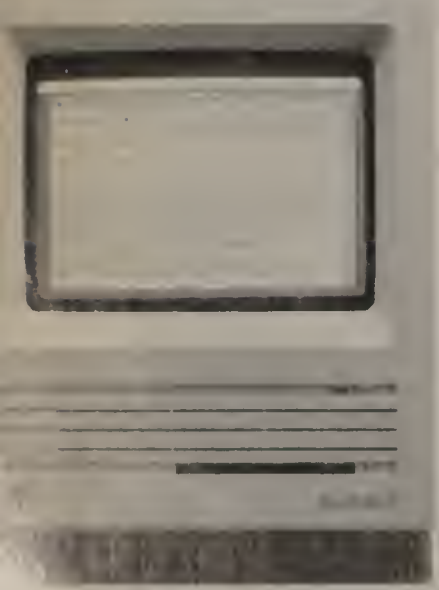

## WHAT DO I NEED?

Our helpful sales and technical staff is standing by to answer any questions and take the mystery out of memory upgrades. Memory cards come with one megabyte on each card and are usually sold in pairs — (2@$59 each).

The chart explains exactly what you need to achieve the desired level of performance.

| To upgrade a 4-socket Mac Plus or SE to this amount of memory | Do this: (Install in multiples of two only) |
|---|---|
| 2 MB | Remove all four existing 256K SIMMs, install two 1M SIMMs, leave two sockets for future expansion. |
| 2½ MB | Remove only two 256K SIMMs, install two 1M SIMMs. |
| 4 MB | Replace all four 256K SIMMs with four 1M SIMMs. |
| **To upgrade an 8-socket Mac II, IIx, IIcx, or SE30 to this amount of memory** | **Do this: (Install in multiples of four only)** |
| 4 MB | Remove all four existing 256K SIMMs, install four 1M SIMMs, leave remaining sockets for future expansion. |
| 5 MB | Keep existing 256K SIMMs, install four 1M SIMMs in remaining sockets. |
| 8 MB | Remove all four 256K SIMMs install eight 1M SIMMs. |

To open your Mac Plus or SE, you'll need a specially designed tool – it's available from us as part of a handy tool kit for just $9.

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Memory chips come factory-installed on plug-in cards, called SIMMS (Single In-line Memory Modules). Each one megabyte SIMM card holds eight top quality, memory chips. We carry chips by all the major manufacturers like Texas Instruments, Intel and Samsung. We also carry the full line of Dove memory products.

Prices can vary a lot, based on quality, speed and demand. At press time our price for 1MB, 100 ns SIMMS is $59. Please call for the very latest prices and availability. Our sales staff will tell you what you need and help make your choice an easy one.

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Do you need 80, 100 or 120 Nanosecond (ns) chips? Nanoseconds are billionths of a second, so an 80 ns chip responds faster than a 100 ns chip. The original Mac used relatively slow 150 ns memory chips. The 68020 processor needs 120 ns (or faster) chip, and the 68030 Macs like the speedier model.

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With PageMaker 4.0, you have more flexibility than ever to make your publication look just the way you want it. Rotate text in 90-degree steps. Condense or expand type from 5-250 percent. Apply point size dependent track kerning, or kern over any range of text to within 0.01 of an em. You can assign type sizes from 4 to 650 points, set leading in increments of 0.1 of a point, or spread text evenly across a column or page.

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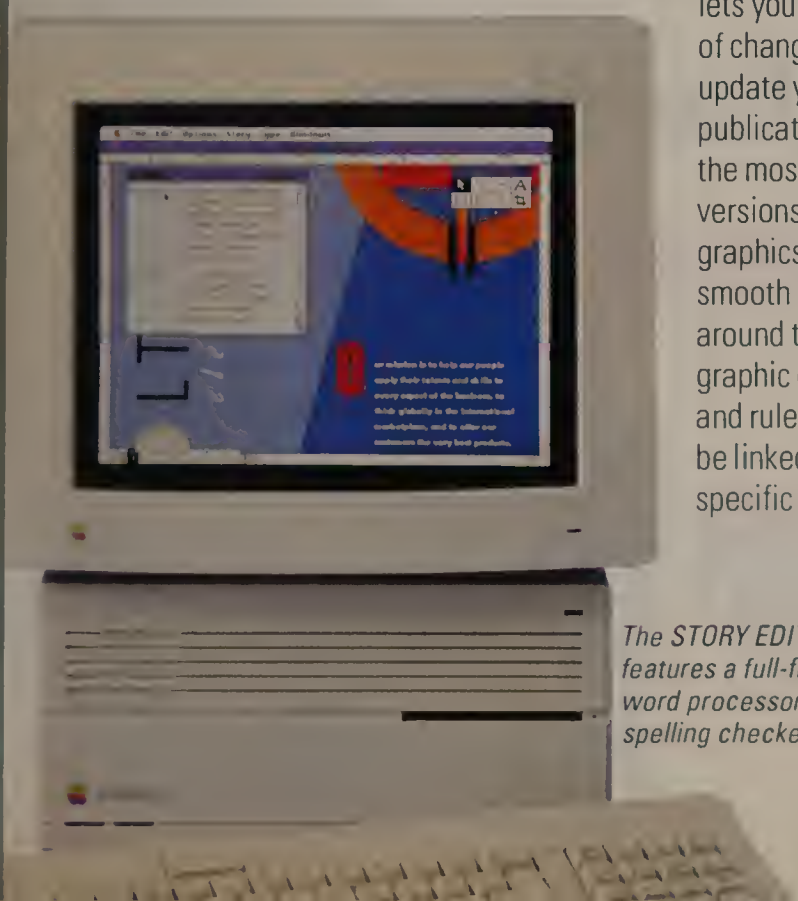
PageMaker 4.0 offers more time-saving and convenience features than ever before! You can generate tables of contents, compile indexes automatically, and edit them with ease. PageMaker 4.0 even lets you keep track of changes or update your publication with the most recent versions of text or graphics. For smooth movement around the page, graphic elements and ruled lines can be linked with specific text.



*The STORY EDITOR features a full-functioned word processor with spelling checker.*

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Just pop this great audio cassette into your tape player and you're ready to begin. You'll learn at your own pace – where and when you like.

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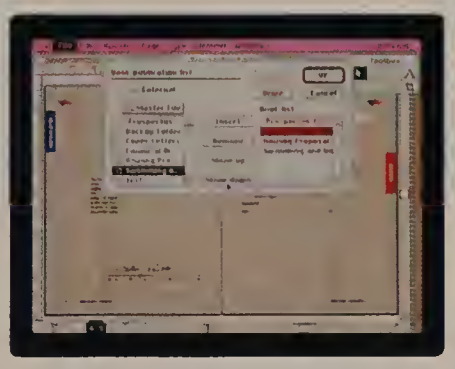
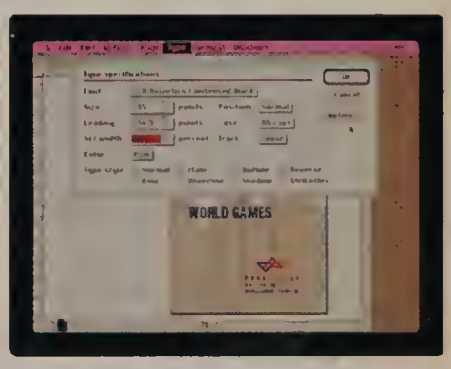


*The BOOK option lets you combine and print multiple files for longer publications.*




*Type sizes can range from 4 to 650 points, and you can kern to within 0.01 of an em.*

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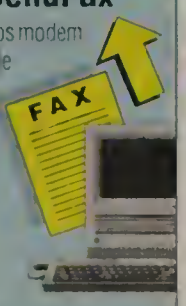


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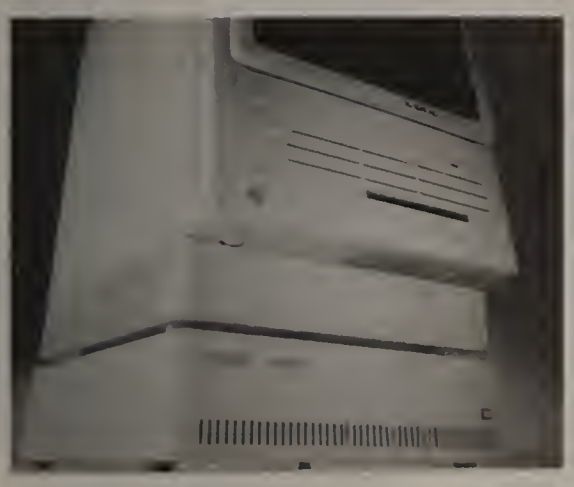

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The Power User Hard Drive includes the popular "Disk Manager Mac" software by On Track, and is pre-formatted, ready to use, right out of the box. Each unit goes through thorough quality control and testing before it leaves the factory. The comprehensive user manual includes all the necessary step-by-step instructions.

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Macinware IIcx Carrying Case ..... 85.
Macinware Mac II Carrying Case ..... 99.
Macinware Plus Carrying Case ..... 64.
Macinware SE Carrying Case ..... 75.
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The Ultimate SE Carrying Case ..... 79.
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SE Silencer ..... 39.
**Targus, Ltd.**
Deluxe Plus/SE-XKB Case (black) ..... 69.
ImageWriter II Case (black) ..... 45.
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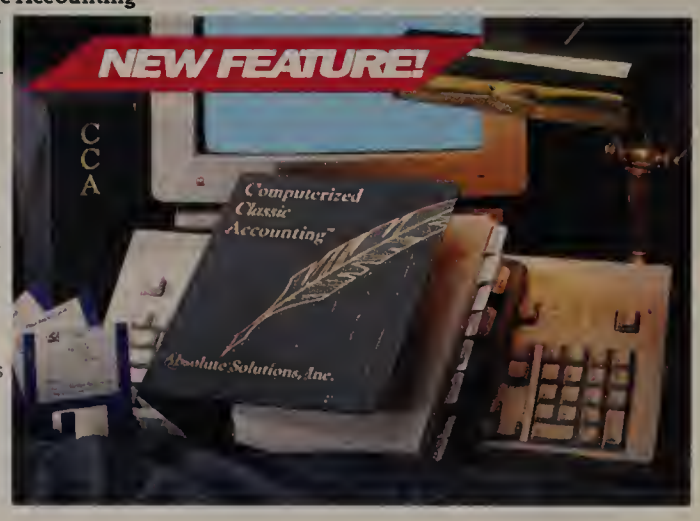


**Softsync, Inc.**
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MacMoney 3.5 ..... 59.

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**Inman Software**
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**Intuit**
Quicken 1.5 ..... 35.
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at Once! ..... 285.
**MECA**
Managing Your Money ..... 135.
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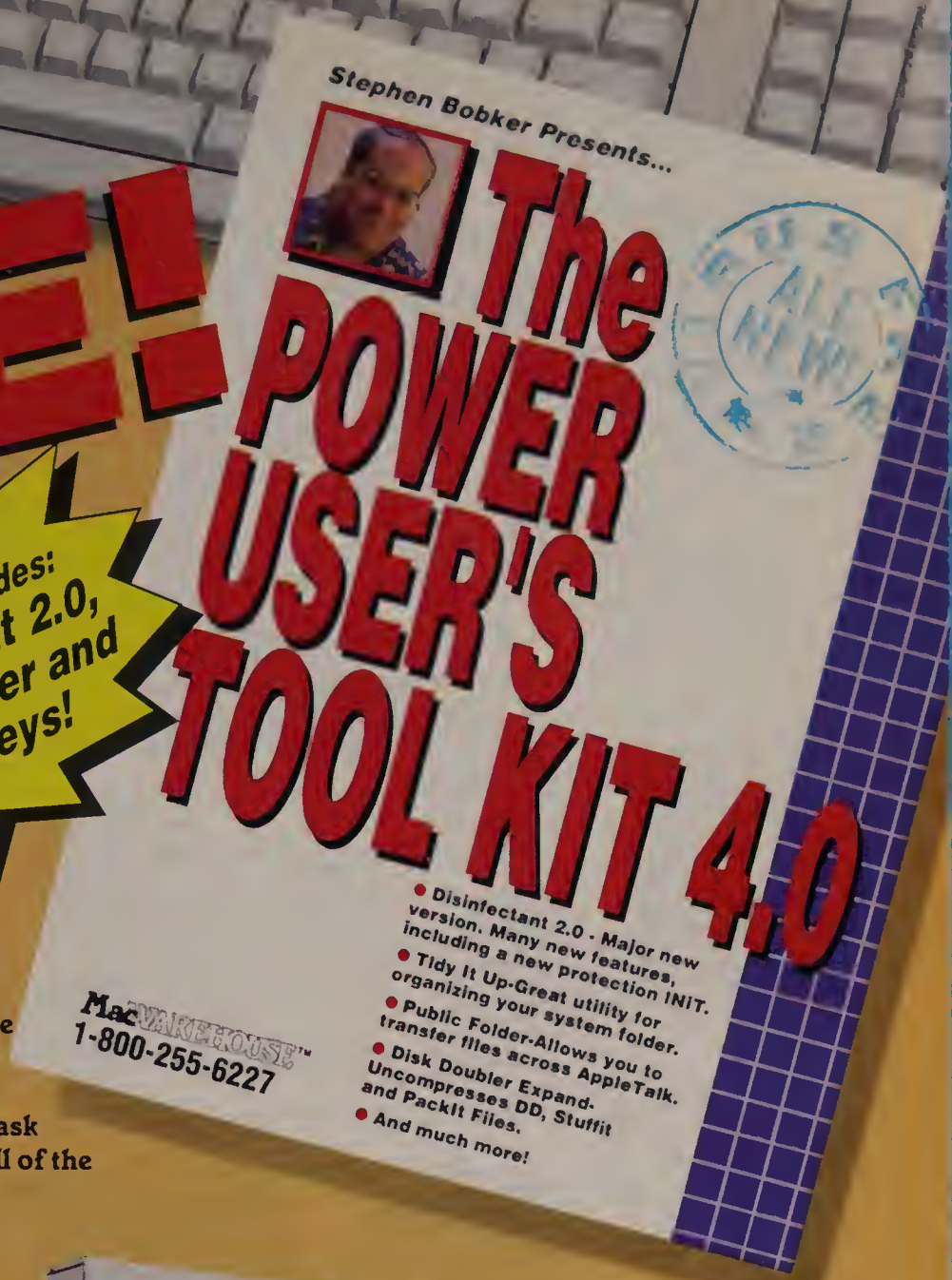


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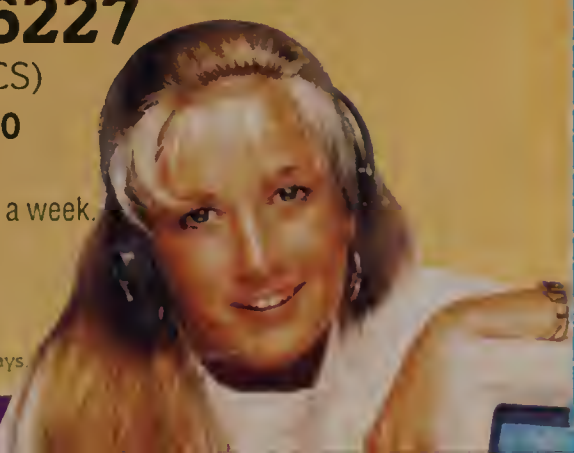

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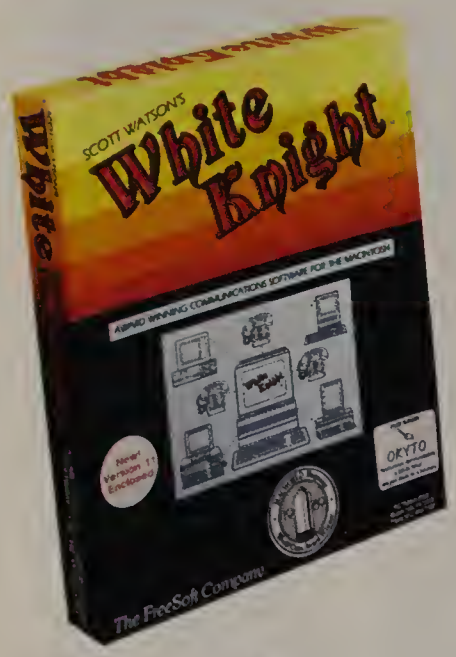


**White Knight V.11 (FreeSoft)**
This award winning communications software includes a reworked user interface with completely reorganized menus and enhanced terminal support including support for the VT-102. It supports the new ZModem protocol, as well as more versions of XModem and Kermit. It works properly with MultiFinder and supports both color QuickDraw and large monitors. Get a *free* subscription to GEnie and a *free* copy of Okyto (a revolutionary Mac-to-Mac file transfer program) with each copy of White Knight. (communications/networking). **$85.**

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**Softview**
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if:X Forms Designer ..... 175.
**Symantec**
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**Symmetry**
KeyPlan ..... 245.
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MacPhonebook 3.0 ..... Call
**T/Maker**
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FastLabel 2.0 ..... 89.
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DeskWorks ..... 229.

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**Innovative Data Design**
MacDraft 2.0 ..... 193.

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**CompuServe**
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MacLink Plus/Translators ..... 99.
**Dove**
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**Farallon™**
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Portable Pack ..... 329.
Star Controller™ EN ..... Call
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Timbuktu 3.1™ ..... 95.
Timbuktu Remote™ 2.0 ..... 123.
**FreeSoft**
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**InSignia Solutions**
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Soft PC 1.3 (Mac II) ..... 245.
**Microcom Software**
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**Microlytics**
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**Preferred Publishers**
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Vantage 1.5 ..... 52.
**Solutions**
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**Tactic Software**
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**Solutions, Inc.**
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**Spinnaker**
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**TimeWorks**
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Under the Mac 45+ Meg ..... 449.
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**Dayna Communications**
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Dayna File Dual 360K & 1.44M ..... 749.
**Daystar**
FastCache IICI ..... 299.
**Fujitsu**
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**ResumExpert (A Lasting Impression)**
Whether you're seeking an entry-level position or an executive's corner office, the ResumExpert Software Series is the next best thing to knowing the boss. Professionally written and fully-formatted Microsoft Word templates let you easily create eye-catching resumes. MacUser 10/89 awarded ResumExpert 4 mice and raved about the "excellent manual" that includes expert writing tips. MacUser 12/89 rated it as one of the Top 200 Software Programs of 1989. See line listings for all 10 editions. (business) **$49. each**

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**OVERNIGHT DELIVERY ONLY $3.00**

**Broderbund**
Shufflepuck Cafe ..... 23.
Where is Carmen Sandiego? ..... ea.29.
**Bull City/Mysterium Tremendum**
Moriarity's Revenge ..... 32.
**Bullseye**
P-51 Mustang/Ferrari Grand Prix . ea.31.
Fokker Triplane ..... 23.
**Centron Software, Inc.**
BlackJack Ace or CrapsMaster ... ea. 27.
BlackJack Strategy Tester ..... 65.
CasinoMaster (5 pack) ..... 49.
CasinoMaster Deluxe Mac II version . 55.
**Electronic Arts**
3 in Three ..... 33.
Block Out ..... 26.
Chuck Yeager Adv. Flight Trainer ..... 32.
Harpoon ..... 39.
StarFlight ..... 39.
**MicroLeague Sports**
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**Microsoft**
Flight Simulator ..... 32.
**Softstream**
22nd St. Whist Tutor/MacRummy ea.32.
**Spectrum Holobyte**
Faces ..... 25.
Tetris ..... 22.
Welltris ..... 20.
**The Software Toolworks**
ChessMaster or Life & Death ..... ea. 32.
Cribbage & Gin King ..... 39.
The Hunt for Red October ..... 20.
**Three Sixty**
Sands of Fire ..... 32.
**Toyogo's Nemesis**
Go Master 4.4 ..... 45.
Joseki Genius ..... 27.
Nemisis Deluxe ..... 99.
**Visionary Software**
Synchonicity ..... 49.
**XOR**
Lunar Rescue or MacGolf 2.0 ..... ea.34.

**Rival Monitors**
**(MegaGraphics Display Systems)**
MegaGraphics Large Screen Monitor Systems include both the interface card and the monitor. Choose monochrome, gray scale, 8 or 24-bit color. All monitors include an ergonomically designed tilt/swivel stand. The systems operate at a high refresh rate (69 to 75 Hz) to deliver a stable, flicker-free image, with a 75 dpi resolution (1024 x 826 pixels). All come with the manufacturer's one-year warranty (extended warranties available through the manufacturer at extra cost). (hardware). **Starting at $1269.**

MacGolf Classic ..... 52.
MacSki or Road Racer ..... ea. 39.
NFL Challenge ..... 55.

## FONTS

**Adobe (Full line available)**
Adobe Type Manager 2.0 ..... 55.
Adobe Type Reunion ..... 38.
Plus Pack ..... 109.
TypeAlign ..... 59.
Type Set 1 or 2 ..... ea. 58.
Typeset 3 ..... 129.

**Altsys**
Fontastic Plus 2.02 ..... 51.
Fontographer 3.01 ..... 249.
Metamorphosis ..... 75.
The Art Importer 2.0 ..... 75.
**Dubl-Click**
Menu Fonts 3.0 ..... 28.
**Letraset**
LetraStudio ..... 275.
LetraFonts (various) ..... ea. 69.
**Pacific Data Products**
MacPage ..... 425.
MacPage PE ..... 459.
**Tactic Software**
ArtFonts ..... 50.

## GRAPHICS /MULTIMEDIA

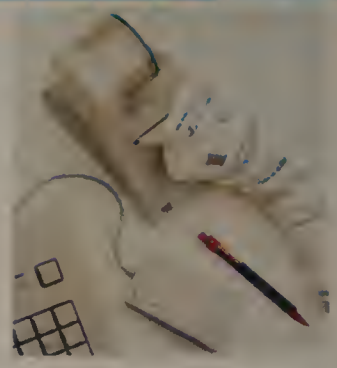
**3G Graphics**
Graphics & Symbols 1 ..... 50.
Business 1 or Accents & Brdrs 1 .. ea.65.
**Adobe**
Illustrator 3.0 w/ATM 2.0 ..... 349.
Photoshop ..... 499.
Smart Art I, II, III, or IV ..... ea. 89.
Streamline ..... 225.

**MacProof 3.2.1 (Lexpertise)**
You'll never get a second chance to make a first impression! MacProof 3.2.1 is your English proofreader. Without leaving your document, it proofreads all text written on your word processor: business, educational, personal and professional. MacProof is a desk accessory for the Macintosh Plus, SE, II, IIcx. It checks mechanics, word usage, writing style and structure. You can customize the usage and spelling dictionaries to your specific requirements. Compatible with MacWrite II V. 1 0, MacWrite V 4.6 & 5.0, Microsoft Word 4 0, PageMaker 3 0/3.01/3.02, w/ 2mg memory, MindWrite V 1 and V 2 (spelling) **$115.**

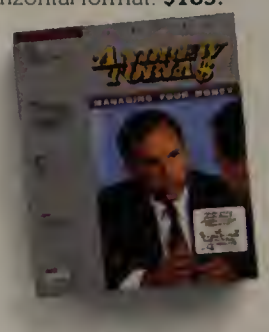
**Aldus**
Freehand 2.0 ..... 329.
**Aperture Technology**
Aperture Visual Information Mgr. ..... 599.
**Bright Star Technology**
HyperAnimator 1.5.1 ..... 98.
interFACE ..... 249.
**Broderbund**
TypeStyler 1.5 ..... 119.
**Claris**
MacDraw II ..... 289.
MacPaint 2.0 ..... 92.
**Deneba**
Canvas 2.1 ..... 189.
Ultra Paint ..... 125.
**Digital Vision**
Computer Eyes B&W ..... 199.
Computer Eyes Pro Color ..... 349.
**Dream Maker**
Cliptures, Vol. 1, 2, 3 ..... ea.69.
MacGallery ..... 27.
**Electronic Arts**
Studio/1 ..... 96.
Studio/8 ..... 295.
Studio/32 ..... 449.

**PassProof (Kensington)**
The *complete* data protection system for your Mac. PassProof comes with a rugged lock & metal plates with tamper-proof screws to block both rear-floppy and SCSI ports. Use it's carefully designed software to assign yourself a master password, add or delete users at will, and monitor a User Log to keep track of attempts to use your Mac. Includes QuickCover, a screen locking program that lets you secure your Mac on command. (security & virus protection). **$69.**

**Farallon™**
MediaTracks™ ..... 189.
MediaTracks Multimedia pack™ .... 319.
MediaTracks™ CD ROM ..... 319.
**Innovative Data Design**
Dreams 1.1 ..... 319.
**Letraset**
ColorStudio ..... 645.
ImageStudio ..... 139.
**MacroMind**
MacroMind Director 2.0 ..... 439.
Media Maker ..... Call
**Metro ImageBase (Full Line Available)**
Art Deco or People ..... ea. 85.
Newsletter Maker or Business ..... ea. 85.
**Micro Frontier**
Enhance ..... 235



**LabelWriter**
The palm-sized LabelWriter puts anything you can create with your Mac onto a 1"x 3-1/2" thermal label (130 per roll). The exclusive print driver software lets you print directly from your database, word processor or any other application. In vertical or horizontal format. **$185.**




**Andrew Tobias' Managing Your Money 3.0**
The most innovative personal finance package for the Mac. Its six main divisions remind you of important dates, manage income and checking, manipulate tax records, evaluate future plans, manage your investment portfolio and calculate net worth. Comes with lots of on-line help and comprehensive manuals. **$135.**

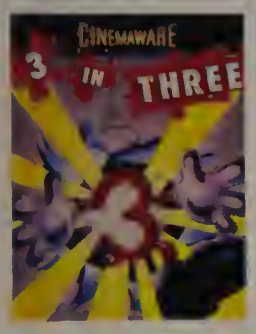
**LYNX Turbo Trackball**
Uses Honeywell aerospace technology to give precise fingertip control over cursor movement. Just spin the trackball and the cursor flies across the screen, quickly and accurately to where you want it. Great for desktop publishing, CAD/CAM, graphics and arcade games. **$59.**

**Rapport, Drive 2.4, 1200 & 360**
**(Kennect Technology)**
Plug Kennect's *New* 5.25" Drives, Drive 1200 and Drive 360 into Rapport to read, write & initialize 1.2 Mb. or 360K MS DOS & Apple *II* 140K ProDOS. Drive 2.4, plugged into Rapport, is a 3.5" Diskette Drive which reads, writes & initializes all Mac & IBM formats, expands 800K disketes to 1.2 Mb & High Density Diskettes to 2.4 Mb. Rapport alone enables older Macs to read 720K MS-DOS on the internal floppy drive or read & write 720K on an external Apple 800K Drive. (disk drives/boards). **Drive 2.4 $329. Drive 360 & 1200 $265 each.**

# MacWAREHOUSE 1-800-255-6227

**NEW! The DataDesk Switchboard (Datadesk International)**
Finally, a keyboard that puts power and comfort within reach! The Switchboard is the first user-configurable keyboard. It allows users to arrange the Alpha, Cursor and Numeric keypads into the most comfortable positions for individual computing needs. Additional input devices (trackball, vertical function keys, digitizer tablet & macro keys) replace existing keypads or can be added. Switchboard's flexibility allows it to evolve with your specific computing needs while preserving desktop space. Modules available. (input/output) **$175.**

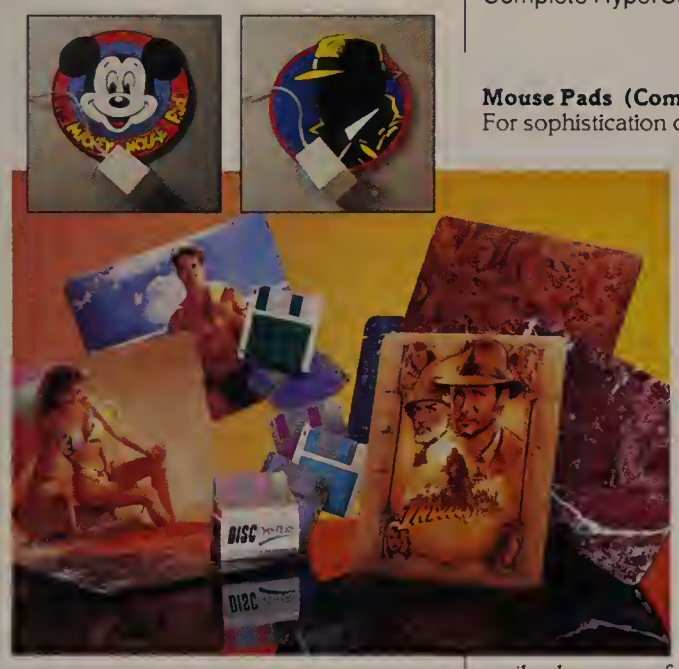
**Quark XPress 3.0**
New measurement and page palettes provide interactive on-screen access. A library stores frequently used items and a pasteboard provides a work area next to each page. Rotate text and graphics in 0.001 degree increments up to 360 degrees. Color trapping ensures precise color printing. **$529.**




**3 in *Three***
3 in *Three* is a rarity...a totally original concept that combines interactive storytelling and puzzle solving in a way never before realized on a Mac. 3 in Three features 80 head-scratching puzzles and 60 animated scenes **$33.**

**Harpoon**
As NATO Task Force Commander you must deploy subs, ships and aircraft to locate, engage and defeat the Soviet's northern battle fleet, poised and awaiting your next move. At your disposal are a database of over 100 NATO and Soviet weapons systems, a Staff Assistant and more. **$39.**

**Multi Ad Services**
Multi-Ad Creator ..... 865.
**Paracomp**
DrawTools ..... 62.
Film Maker ..... 439.
ModelShop 1.1 ..... 375.
Swivel 3D Professional 1.0 ..... 439.
Swivel ART ..... 87.



**Mouse Pads (Computer Giftware)**
For sophistication during hours-and excitement after! **Executive Pads** put the elegance of marble on your desk. Choose from White Italian Marble, Green Marble, Granite, and even Kentucky Burlwood. After the grind why not invite a Bikini-clad California Girl or Volley Ball Hunk over to your **Bachelor or Bachelorette Pad? $12.** The truly daring may even opt for an exciting **Indiana Jones** adventure. **$13.** MacWarehouse is now your exclusive mailorder source for new **Mickey Mouse** & **Dick Tracy** mouse pads! **$13.** (accessories)

**Silicon Beach**
Digital Darkroom 2.0 ..... 248.
Super 3D 2.1 ..... 339.
SuperPaint 2.0 ..... 135.
**Solutions, Inc.**
Curator ..... 87.
**Somak**
LaserArt CD-ROM #1 or #2 ..... ea. 62.
Sharpen Up ..... 62.
**Strata**
StrataVISION 3d ..... 375.
**Strategic Mapping, Inc.**
Atlas Map Maker 4.5 ..... 369.
**Studiotronics**
Colorset 1.5 ..... 229.
**SuperMac**
PixelPaint 2.0 ..... 225.
PixelPaint Professional 2.0 ..... 389.
**Tactic Software**
Art Clips Vol. 1 or Vol. 2 ..... Call.
**T/Maker**
Click Art Business Images ..... 32.
EPS Illustrations ..... 82.
Business Cartoons ..... 33.
**Zedcor**
DeskPaint 3.0 and DeskDraw ..... 115.

## HARDWARE & PERIPHERALS

**Aapps**
DigiVideo B&W ..... 399.
DigiVideo Color ..... 689.
**Co Star**
Label Writer ..... 185.
**Cutting Edge**
19" Two Page Monitor ..... 959
**Hewlett Packard**
HP DeskWriter ..... 779.
**MegaGraphics Display Systems**
Rival 2001 System for Mac II ..... 1269.
Rival 3001 System for Mac SE/30 . 1269.
Rival SE System for Mac SE ..... 1269.
Rival Plus System for Mac Plus ..... 1310.
19" Color 2008 Hi-Res/Mac II ..... 4459.
16" Color 2008 Hi-Res/Mac II ..... 3495.
Grayscale 2008/Mac II ..... 2195.
Grayscale 3008/Mac SE/30 ..... 2195.
**Microtek**
Microtek MSF-300GS Scanner ..... 1589.
Microtek MSF-300ZS Scanner ..... 1998.
**NEC ( Full line available)**
Intersect CDR-35 ..... 399.
**Qume**
Crystal Print Publisher II ..... 2900.
**Seikosha America**
Seikosha Printer (dot-matrix) ..... 235.
**Sharp (full line available)**
The Wizard - 7000 ..... 219.
The Wizard OZ 7200 (64K RAM) ..... 255.
**ThunderWare**
LightningScan 400 ..... 385.
ThunderScan Plus ..... 199.

## HYPERWARE

**Bantam**
Complete HyperCard Handbook ..... 22.

**Beacon Technologies**
HyperBible International Version ..... 175.
HyperBible King James Version ..... 145.
**DataDesk International**
HyperDialer ..... 32.
**MicroMaps**
HyperAtlas ..... 59.
**Silicon Beach**
SuperCard 1.5 ..... 205.
**Symmetry**
HyperDA 1.2 ..... 45.

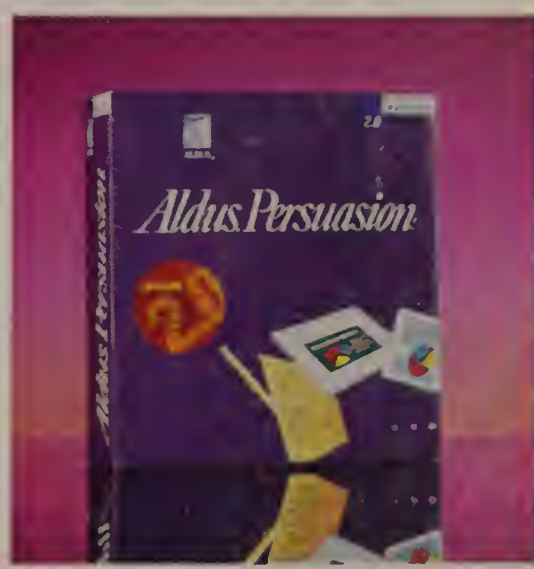
## INPUT/OUTPUT

**Altra**
Felix ADB ..... 127.
**Basic Needs**
Cordless Mouse ..... 99.
**Caere**
Typist ..... New 499.
**Calcomp**
WIZ Tablet ..... 159.
WIZ Pen ..... 57.
WIZ Templates ..... 19.
**CH Products**
Mach IV Plus Mouse/Joystick ..... 51.
Mirage Adaptor ..... 35.
Roller Mouse ADB ..... 75.
**DataDesk Intl.**
DataDesk Switchboard ..... 175.
Mac 101 Keyboards ..... 129.

**Metro ImageBase Electronic Clip Art (Metro ImageBase)**
Liven up your documents with professional-quality electronic clip art from Metro ImageBase! Classy and up-to-date, they make your newsletters, presentations, reports and brochures communicate more effectively. Each of Metro's 14 packages is topic-related and contain 100 images-each drawn at 300 dpi for maximum resolution. Packages available include: ReportMaker, Business Graphics, Computer & Technology, NewsletterMaker and 10 more. (graphics). **$85.**

**Forte Communications**
Remote Keyboard/Mouse ..... 289.
**Kensington**
New Turbo Mouse ..... 109.
**Keytronic**
MacPro Keyboard ..... 118.
**Koala**
MacVision 3.0 ..... 269
**Kraft**
ADB Joystick Premium III (SE&II) ..... 49.
QuickStick ..... 39.
Trackball ..... 79.

**Persuasion 2.0 (Aldus)**
Persuasion streamlines the process of creating desktop presentations. Just type your ideas into a pre-defined outline template and Persuasion automatically prepares your slides. Emphasize important points with any of its pre-defined charts and graphs. Give the command and Persuasion will format speeches to match presentations and even print audience handouts. Use its slide show mode to make smooth, professional presentations. Persuasion comes with 15 different wipe/dissolve effects and includes drivers for most popular printers and film recorders. (business). **$329.**



OVERNIGHT DELIVERY ONLY $3.00 (details below)

## GUARANTEE

Many of our products come with a thirty day money back guarantee, if you are not completely satisfied. Ask for details when you place your order.

**Trackball ADB (Mouse Systems)**
Mouse functionality in a fraction of the space. Use Trackball ADB to quickly flip through menus or glide instantly across the screen. Its ergonomic design provides hours of comfort while delivering smooth, accurate, cursor positioning. **$75**

**Little Mouse**
Great for graphics, CAD, business and more. Little Mouse is 22% smaller, 38% lighter and provides over 50% more resolution and control than other Apple mouse alternatives. It combines advanced optical technology with the latest CMOS analog/digital chip design to deliver a wonderfully compact and accurate input device. (input/output). **$69.**

**LYNX**
LYNX Turbo Trackball ..... 59.
**MicroSpeed**
MacTrac ADB ..... New 75.
MacTrac DB9 ..... 62.
**Micro Touch**
The UnMouse ..... 189.
**Mouse Systems**
TrackBall ADB ..... 69.
Little Mouse ..... 75.
**Practical Solutions**
Mouse Master ..... 39.
**Summagraphics**
Bit Pad Plus ..... 319.

## LANGUAGES

**Digitalk, Inc.**
Smalltalk/V MAC ..... 125.
**Shana Corporation**
Inside Out ..... 369.
**Symantec**
THINK'S C 4.0 or Pascal ..... ea. 165.
**Zedcor**
ZBasic 5.0 ..... 99.

## MEMORY UPGRADES/ ACCELERATORS

**1 MEG SIMMS**
Low Profile, 100ns High Quality
Single In-Line Memory Modules ..... 59.
For MacPortable ..... 435.
For IIfx - 80ns ..... 109.
For LaserWriter II NTX - 80ns ..... 109.
**Dove (full line available)**
MaraThon 030 Accelerators ..... 529.
MacSnap 524E ..... 185.
MacSnap 524S ..... 239.
MacSnap 548S ..... 499.

## MODEMS/FAX

**Abaton**
InterFax12/48 ..... 265.
InterFax 24/96 ..... 419.
**Best Data Products**
SmartOne 2400/1200 ..... 139.
**Dove**
DoveFax desktop ..... 299.

**Global Village**
Teleport ..... 129.
**Hayes**
Smartmodem 2400 ..... 349.
Smartmodem 9600 (V series) ..... 729.
**Power User™**
2400 baud modem ..... 99.
24/96 Mini Send Fax ..... 149.
24/96 Mini Send/Receive Fax ..... 149.

**SmartOne 2400/1200 Modem (Best Data Products)**
When you need a 2400 baud modem, the SmartOne 2400/1200 provides an economical alternative. For less than the cost of some 1200 bps units, you get a Hayes compatible modem with auto answer/originate, 300, 1200 and 2400 baud operation, pass-through phone jack, speaker with programmable volume, and a manufacturer's two-year warranty. All user options are stored in non-volatile memory. Includes free Quicklink II communications software, modem, cable and **CompuServe/Prodigy Start-Up Kit** offer. (modems) **$139.**

**Prometheus**
MaxFax ..... 309.
2400 MFax ..... 209.
ProModem 2400 SE Int. ..... 209.
ProModem 2400M ..... 199.
ProModem 2400M II ..... 205.
Travel Modem ..... 205.
**Supra**
Supra Modem 2400 ..... 119.

## MUSIC AND SOUND

**Altech**
MIDI Interface ..... 59.
**Coda**
MacDrums ..... 31.
Perceive ..... 49.
**Electronic Arts**
Deluxe Music Construction 2.5 ..... 85.
Deluxe Recorder ..... 99.

**SmartBundle (T/Maker)**
NEW! A total solution for first-time Macintosh buyers. A collection of four easy-to-use, award-winning applications in one bundle at an incredible price! Includes WriteNow 2.2 for wordprocessing, Full Impact 1.1 for spreadsheet and charting, SuperPaint 2.0 for painting and drawing and RecordHolder+ for database management. Also includes SmartBundle Launch, a customized version of DT Launch which allows easy access to each application (business) **$219.**

**Farallon™**
MacRecorder 2.0™ (records sound) 159.
MacRecorder ™ Voice Digitizer ..... 99.
**Passport Designs**
NoteWriter II 2.3 ..... 325.
Passport MIDI Interface ..... 89.
**Primera Software**
Different Drummer ..... 59.
**Repertoire**
Music Publisher ..... 359.
**Resonate**
Listen 2.0 ..... 62.
**Tactic Software**
Sound Clips Vol. 1 ,2,3,or 4 ..... ea. 49.

## SECURITY & VIRUS PROTECTION

**ASD Software, Inc.**
FileGuard 2.5 ..... 139.
FileGuard Office 5-pack ..... 349.
FileGuard Office 10-pack ..... 579.
**Fifth Generation**
Disk Lock ..... 118.
**Kensington**
Pass Proof ..... 69.
**Kent Marsh**
MacSafe II ..... 107.
NightWatch ..... 86.
QuickLock ..... 34.
**Mainstay**
AntiToxin ..... 59.

**Microcom**
Virex ..... 59.
Virex 10-pack ..... 329.
**Symantec Corporation**
S. A. M. ..... 67.

**MacSki (XOR)**
No Snow? No Problem! MacSki brings the slopes to you! The only thing you'll need is a little daring while swooshing through these runs in digitized sound and full color. Select any of up to 20 breathtaking layouts or design your own dream course using MacSki's built-in Course Editor. Create up to 256 different course combinations based on difficulty level, snow condition, visibility and wind speed. Meet you at the top! (entertainment). **$39.**

## SPELLING/DICTIONARY THESAURUS CHECKERS

**Deneba Software**
BigThesaurus ..... 64.
Spelling Coach Pro 3.1 ..... 124.
**Electronic Arts**
Thunder II ..... 49.
**Lexpertise**
MacProof 3.2.1 ..... 115.
**LifeTree**
Correct Grammar ..... 49.
**Microlytics**
Word Finder 2.0 ..... 34.
**Sensible Software**
BookEnds or Sensible Grammar ..... 51.

## STATISTICAL ANALYSIS

**Abacus Concepts**
StatView II ..... 279.
StatView SE+Graphics ..... 179.
SuperANOVA ..... 309.
**Wolfram Research**
Mathematica (SE) ..... 450.

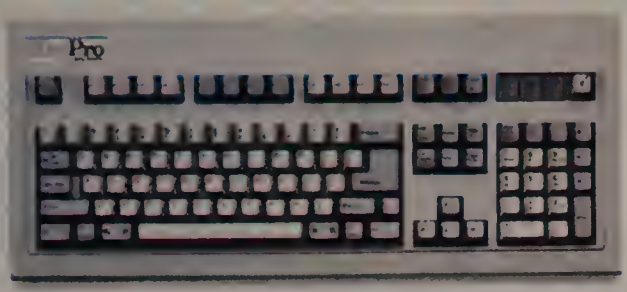
**FastForms 2.0 (Power Up)**
Use this powerful forms management system to quickly create, customize, fill, save, archive and print professional quality custom business forms. Then import and export data into user defined fields to perform automatic calculations. **$105.**

**Calendar Creator**
View your customized schedule at a glance. Gives you control over recurring events, event order, fonts, printing format, multiple schedule juggling, event lists and master schedule production. Great for individual and group time management. (business). **$38.**

## CompuServe

[illegible] MacWAREHOUSE to place orders with us in Electronic Mall on CompuServe. The MacWAREHOUSE GO code [illegible] MW [illegible] you a page for dependable overnight service and [illegible] for Harry or any of our support staff.

**MacPro Keyboard (Key tronic)**
The Mac Pro keyboard feels better, lasts longer and offers more features for your money. Key tronic's new ADB-compatible 105-key MacPro features an enlarged L-shaped Return key for faster, more accurate data entry. Dual-legend keycaps assure ease of operation in both Macintosh and MS-DOS environments. Includes a FREE copy of the award winning macro package Tempo II. Backed by a three year manufacturer warranty. (input/output) **$118.**



## UTILITIES

**Abbott Systems**
CanOpener 1.1 ..... 64.
Chesire 1.0 ..... 63.
**Aladdin Systems Inc.**
Programmer's Assistants ..... 57.
Shortcut ..... 46.
StuffIt Deluxe ..... 63.
**ALSoft**
DiskExpress II 2.04 ..... 57.
MultiDisk ..... 49.
Master Juggler ..... 64.

**Planisoft (ASD Software)**
Planisoft increases workplace productivity through detailed management of time and resources. Use its intuitive user interface and powerful relational database to simultaneously manage and record activity concerning hundreds of people, events, materials and locations. Juggle multiple work group agendas and instantly recall your contacts and related data for a given period of time. Also tracks time spent on a particular account by individual employees. Everything is kept confidential through multi-level password protection. (business). **$139.** Office 5 pack **$579.** Office 10 pack **$839.**

**American Power Conversion**
Power Chute ..... 69.
**Berkeley System**
After Dark 2.0 ..... 24.
**CE Software**
Alarming Events ..... 85.
QuicKeys 2.0 ..... 64.
**Caere**
OmniDraft ..... 69.
OmniPage 2.1 ..... 539.
OmniSpell ..... 69.
OmniTrace ..... 105.
**Central Point Software**
Copy II Mac ..... 23.
Mac Tools Deluxe ..... 75.
**Custom Applications**
Freedom of Press 3.0 ..... 225.
Freedom of Press Light 3.0 ..... 255.
**Dantz Development**
Retrospect ..... 148.
**Dayna Communications**
DOS Mounter ..... 55.

**Fifth Generation**
FastBack II ..... 118.
Suitcase II 1.2 ..... 49.
SuperLaserSpool 2.0 (single user) ..... 87.
SuperSpool 5.0 ..... 58.
**ICOM Simulations**
On Cue ..... 35.
**Insight Development**
MacPrint ..... 95.
**Magic Software**
AutoSave II ..... 28.
BackMatic ..... 50.
**Mainstay**
Capture 3.0 ..... 45.
MacFlow 3.5 ..... 125
**Preferred Publishers**
Personality ..... 53

**Software Innovations**
Handoff II ..... 52.
**Tele Typesetting Co.**
TScript v. 1.3 ..... 95.

## WORD PROCESSORS & OUTLINERS

**Claris**
MacWrite II ..... 142.
**Microsoft**
Word 4.0 ..... 245.
**RightSoft**
RightWriter for the Mac ..... 55.
**Tactic**
Magic Typist ..... 49.
**T/Maker**
WriteNow 2.2 ..... 119.
**WordPerfect Corp.**
WordPerfect ..... Call

**FileGuard 2.5 (ASD Software)**
"FileGuard stands out, especially for corporate users." MacUser May, 1990 Issue
Protect your Hard drives and Partitions from unauthorized access (including security bypass with a system diskette), copying, and erasure. Applications and Files/Folders (including system folder) from unauthorized access, deletion, and/or illegal copying; Desktop (including system folder) from alterations by unauthorized users; Keep an eye on System Usage with the system users log which continuously tracks user/group activity (security) **$139. Office 5 Pack $349. Office 10 Pack $579.**

Circle 78 on reader service card

# STOP PRESS

**Cutting Edge H[illegible] Disk Drives (Cutting Edge)**
New enhanced Cutting Edge drives deliver quiet, reliable memory with access times as low as 20ns. New features include two power outlets, 50-pin cables for easier daisy chaining, a quieter fan, dual-fuse surge buffer and simplified operation manuals.

Available in 20MB to 80MB sizes. **20MB Only $ 339., 30+MB Only $ 399., 45+MB Only $449., 60+MB Only$489., 80+MB Only $539.**

The enhanced 45MB Removable is based on the same award winning SyQuest mechanism that other leading makers offer at twice the price. Exchangable cartridges provide unlimited storage (drives) **45MB Removable: $ 699.**

**Power User™ 2400 baud Modem**
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Painting devices
Looking inside
Macintosh Classic

THE

# Macintosh Family Evolves

**Apple finally offers a selection of Macintosh computers and peripherals that combine lower prices with competitive functionality. The question is, are the prices low enough?**

The long-awaited low-cost Macintoshes have arrived—five of them. I'd like to be able to tell you that you can get a color Mac or Mac II power for under $1000. You can't. Chips and disk drives still cost too much, and Apple is in Cupertino, not the North Pole.

Although Apple hasn't figured out how to give us tomorrow's computer today, it has lowered prices an impressive $1000 or more for all Mac systems except the Portable, the SE/30, and the IIfx. The company has completely restructured the Mac family by adding three new lower-cost machines, cutting prices on the IIci, and abandoning four others. In other words, everything you knew about the Macintosh family has changed.

At first glance, this restructuring is confusing and unsettling. Some of the changes may be hard to swallow. Think of this article as a digestive aid. Besides exploring the structure of the new Macintosh family, it describes what you get for your money; evaluates how the new prices compare with those of other personal computers; and explains which Macintoshes best suit certain individual needs.

### Comings and Goings

Here's a brief overview of the new Macintosh computers: The Macintosh Classic is a redesigned Mac SE with no expansion slot and nothing to gloat about beyond its low price. The Mac IIsi is a reduced-height IIcx replacement; it has built-in color video but only one expansion slot, another repackaging job with an appealing price. By far the most intriguing of the new models is the Macintosh LC—a reincarnated Mac II with built-in color video for half the money. Its low price and pizza-box shape unfortunately limit it to a single custom expansion slot.

The LC and the Classic come with a new ADB keyboard. Other new Macintosh products include a small color monitor, a redesigned monochrome monitor, and two expansion cards for the LC—one of which

BY LON POOLE

PHOTOGRAPHS BY MARK JOHANN

lets the LC work like an Apple IIe. The Classic and IIsi were scheduled to ship mid-October, and the Mac LC should be available January 1991 (the Apple IIe emulation card should ship the following March). In other words, everything you knew about the Macintosh family has changed.

You can recognize the new Macs by their curved front panels and by some shared internal traits. The new computers come with 2 megabytes of RAM, preparing them for System 7.0 when it becomes available next year (the Classic is available as a 1MB system as well). System 7.0's virtual memory feature won't work on the Classic and LC, however, because neither machine comes with a memory-management chip. Other features shared by the new machines include the 1.4MB SuperDrive for floppy disks; space for one internal one-third–height hard drive; and built-in video. In addition, the LC and IIsi come with microphones for direct sound input.

**Shaking the Family Tree**

With the introduction of these new family members, say good-bye to the two old-timers at the low-end of the Macintosh family—the Mac Plus and the Mac SE. The Classic boasts all the performance and features of an SE (except an expansion slot), and yet it costs less than the slower, more limited Plus. The lost expansion slot doesn't bother me. You'll still be able to upgrade a Classic by clipping an expansion board onto the processor chip, as is now done with the Mac Plus.

Low price alone isn't enough. The Plus has been $800 cheaper than an SE for a year now and yet the SE has been the more popular machine. Buyers want more performance than the Plus delivers. I wonder if they'll be satisfied with the classical performance of the original SE.

Apple has carefully calculated the Classic's price-performance balance to make this new minimal Macintosh an attractive deal for those on the tightest budgets. In the basic U.S. retail configuration—1MB of RAM, a 1.4MB

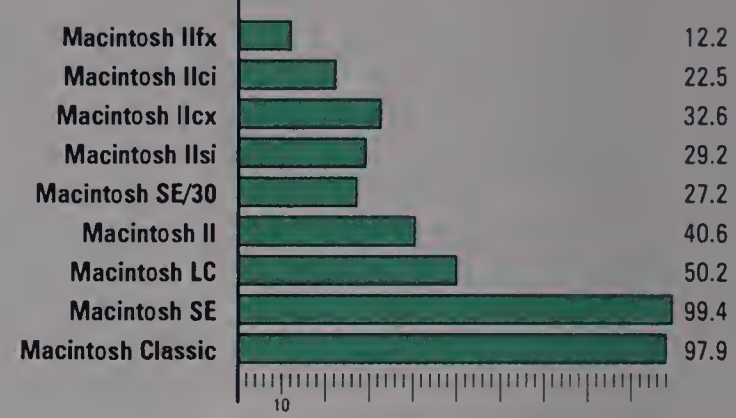
# Ranking the New Macintoshes

All times are in seconds

## Processor Tests

### Graphics Tasks

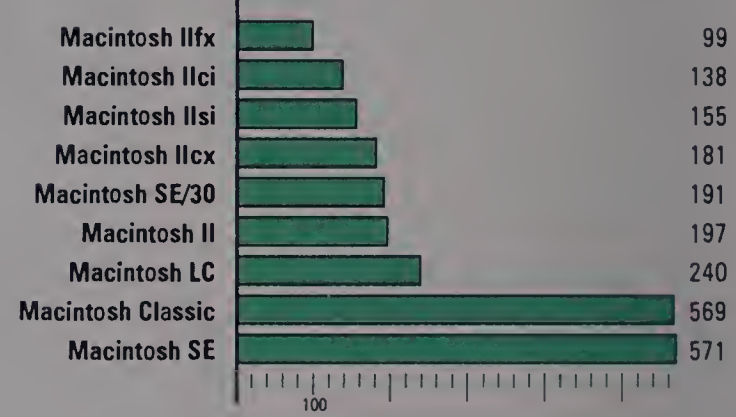
We tested several graphics programs such as FreeHand, Illustrator, and MacDraw performing tasks such as preview, zoom, and fit to window.




## Disk Tests

### Sort 4D Database

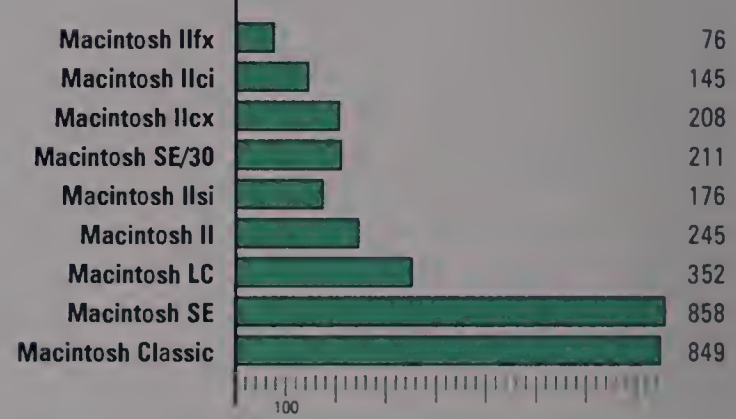
To test a repeating random disk access, we sorted a 3.2MB 4th Dimension database.




## Math Tests

### Tween Swivel Image

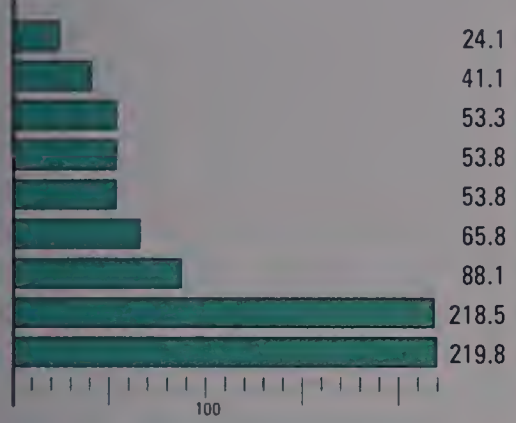
To test the Mac's ability to handle mathematical operations, we timed a calculation-intensive tween in Swivel 3D.




Overall, the Macs placed exactly where you'd think they would—the Macintosh IIfx is fastest and the Macintosh Classic and SE come in last. The Macintosh IIsi showed a slight advantage in graphics tasks over the Macintosh IIcx (the Macintosh SE/30 was even faster because its

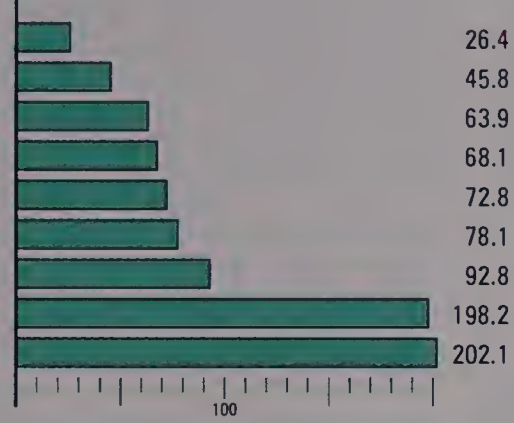
## Find/Replace

For this test, we replaced the word *Mac* with the word *Macintosh* 1300 times in Word, Works, WriteNow, and MacWrite II.



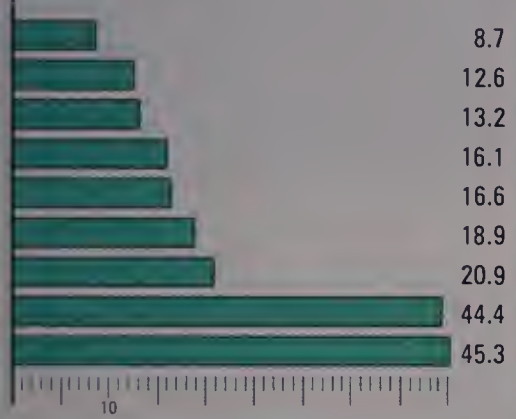

## Scroll

We tested scrolling response time for documents in several applications—Word, Excel, Works, PageMaker, Wingz, WriteNow, and MacWrite II.



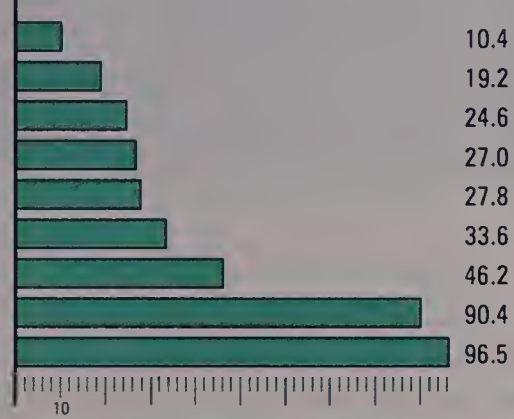

## Open Files

To test a one-shot random disk access, we opened a wide variety of files by clicking on the application's icon.



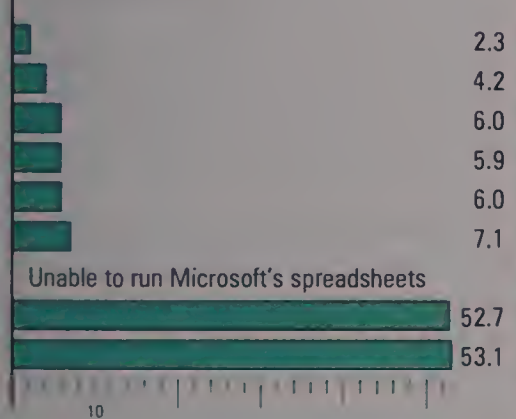

## Save Word File

To test disk write times, we used Word's Save As function to save a 220K file.



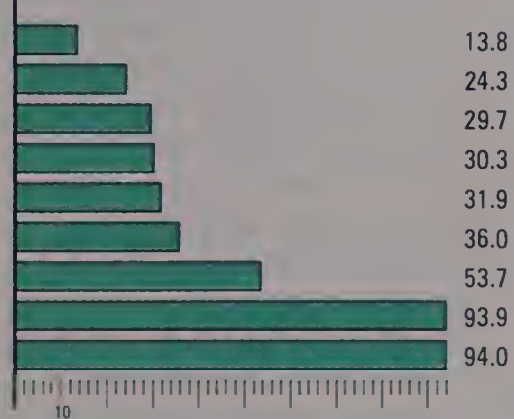

## Recalculate Spreadsheet

For business users, we recalculated a 400K Excel spreadsheet and a 110K Works spreadsheet.




## Redraw Wingz Chart

Likewise, we tested how long it took Wingz to redraw a 33K, three-dimensional bar chart.




small black-and-white screen redraws faster). At press time, the Macintosh LC couldn't run Excel or Works spreadsheet—Microsoft should have the incompatibility solved by the time the Mac LC ships (Times are averaged wherever multiple programs were tested.)

floppy disk drive, a built-in 9-inch black-and-white monitor, and keyboard—the Classic lists for $999. This system will be important to users who can do without System 7.0. The Classic is also available with 2MB of RAM and a 40MB internal hard drive for $1499.

One step up from the Classic in price, but four steps up in capability, is the new Mac LC. The extra $1000 or so you pay for an LC buys about twice the performance and lots more expandability. In addition, the LC has built-in sound input and video output. Keyboard and microphone are included; all you add is a color or monochrome monitor. List price of a color LC system with 2MB of RAM, a 40MB hard drive, and Apple's new 12-inch color monitor is about $3000. A monochrome system lists for $300 less. The anticipated street price for the color system is about $2200. That's a great price.

A standard LC provides 256 colors on Apple's new 12-inch color monitor or 16 colors on the 13-inch AppleColor High-Resolution RGB Monitor. To get 256 colors on the 13-inch monitor, you snap a $249 video SIMM board into the LC. The board is necessary because the larger monitor displays 50 percent more information (640 by 480 pixels versus 512 by 384). On Apple's 12-inch monochrome monitor, which, confusingly, displays the same amount of information as the 13-inch color monitor, the LC provides 256 gray shades without the video SIMM.

Next above the Mac LC in price and performance is the familiar Mac SE/30. The same size as a Classic, the SE/30 is three times faster and more expandable. The SE/30 is also the cheapest Macintosh able to use all System 7.0 features, including virtual memory. An SE/30 system with 1MB of RAM, a 40MB internal hard drive, a built-in 9-inch black-and-white monitor, and a standard keyboard lists just over $4000. With dealer discounts, you will probably pay about $2900 for it—about what you used to pay for a Macintosh SE with 1MB of RAM and no hard drive.

# MAC Family

## MACINTOSH FAMILY PROFILE

| | Processor | Data Path | Math Coprocessor | Memory Management Unit | Static RAM Cache | Dedicated I/O Processors | ROM Capacity/ Expandable |
|---|---|---|---|---|---|---|---|
| **MACINTOSH FAMILY AS OF JANUARY 1991** | | | | | | | |
| Classic | 68000–8MHz | 24-bit | no | no | no | no | 512K/no |
| Portable | 68000–16MHz | 24-bit | no | no | no | no | 256K/yes |
| LC | 68020–16MHz | 16-bit | no | no | no | no | 512K/yes |
| SE/30 | 68030–16MHz | 32-bit | yes | yes | no | no | 256K/yes |
| IIsi | 68030–20MHz | 32-bit | optional [3] | yes | no | no | 512K/yes |
| IIci | 68030–25MHz | 32-bit | yes | yes | optional | no | 512K/yes |
| IIfx | 68030–40MHz | 32-bit | yes | yes | yes | yes | 512K/yes |
| **DISCONTINUED MACINTOSH MODELS AS OF JANUARY [4]** | | | | | | | |
| 128K | 68000–8MHz | 24-bit | no | no | no | no | 64K/no |
| 512K | 68000–8MHz | 24-bit | no | no | no | no | 64K/no |
| 512KE | 68000–8MHz | 24-bit | no | no | no | no | 128K/no |
| Plus | 68000–8MHz | 24-bit | no | no | no | no | 128K/no |
| SE | 68000–8MHz | 24-bit | no | no | no | no | 256K/no |
| II | 68020–16MHz | 32-bit | yes | optional | no | no | 256K/no |
| IIx | 68030–16MHz | 32-bit | yes | yes | no | no | 256K/yes |
| IIcx | 68030–16MHz | 32-bit | yes | yes | no | no | 256K/yes |

*[1] The Portable requires a low-power internal hard drive.*

*[2] By installing a video upgrade, the LC supports 512 x 382 (32,000 colors/grays) or 640 x 480 (256 colors/grays).*

*[3] The IIsi requires a $249 adapter to use the expansion slot. The adapter includes a math coprocessor.*

*[4] While remaining Plus, SE, IIx, and IIcx models may be sold after January 1, 1991, they are being phased out.*

### The Mac II Line

The next branch on the family tree belongs to the Mac II line. While the IIcx has been the most successful model of these, sales have been limited by a relatively high price. To boost sales volume, Apple designed the new Mac IIsi, which retains the best features of the IIcx and even delivers a bit more performance but costs $1800 to $2300 less (depending on configuration). The IIsi is housed in a smaller box than the other Mac IIs, leaving less room for expansion—the IIcx has three expansion slots, one of which must contain a video board, whereas the IIsi has one slot and built-in video support for most Apple monitors. You have to use the one slot for a video board if you need 24-bit color or a 2-page monitor, however. The basic IIsi configuration includes 2MB of RAM, a 40MB hard drive, and the same type of sound input as the Mac LC. That plus a keyboard and 13-inch color monitor costs about $4900 list, (discount prices should run about $3200). A IIsi system with an Apple full-page monitor costs about the same as a color system. List price of a monochrome system is about $700 less.

To get the expandability of a Mac IIcx you have to buy a Mac IIci. Fortunately that's now much easier to do. Apple has lowered IIci prices by $1500—you can now buy a IIci for what a IIcx used to cost. At estimated street prices, you'll pay about $5300 for a Mac IIci with 4MB of RAM, an 80MB hard drive, a keyboard, and a 13-inch color monitor. List price on that system is about $7900.

The IIci is about one-third faster overall than the IIcx, and its performance can be further enhanced by adding a static RAM cache board. Both the IIci and the IIcx have three expansion slots. The slot normally used for a video board in a IIcx is available in many IIci systems because the IIci has the same type of built-in video support as the IIsi. The Mac IIci is a great machine on paper, but in actual use it has been plagued with compatibility problems. Many of the problems have been fixed by new versions of application programs and upgraded hardware from other companies. Apple says most of these problems foreshadow the trouble all Macintosh models will have upon switching to System 7.0.

| RAM Capacity | Expansion Slots | Internal Hard Drive (Height/Disk Size) | Floppy Drive | Sound (Output/ Input) | Built-in Video | Video Resolution | Keyboard (Included/ Connector Type) |
|---|---|---|---|---|---|---|---|
| 1MB–4MB | 0 | 1"/3½" | 1.4MB | mono/no | b & w | 512 x 342 | yes/ADB |
| 2MB–9MB | 1 (Portable direct, 1 modem) | 1"/3½" [1] | 1.4MB | stereo/no | b & w | 640 x 400 | yes/integral |
| 2MB–10MB | 1 (020 direct) | 1"/3½" | 1.4MB | mono/yes | color | [2] | yes/ADB |
| 1MB–32MB | 1 (030 direct) | any/3½" | 1.4MB | stereo/no | b & w | 512 x 342 | no/ADB |
| 2MB–17MB | 1 (NuBus/030 direct [3]) | 1"/3½" | 1.4MB | stereo/yes | color | 640 x 480 (256 color/grays), 640 x 780 (16 grays), 512 x 382 (256 colors) | no/ADB |
| 1MB–32MB | 3 (NuBus) | any/3½" | 1.4MB | stereo/no | color | 640 x 480 (256 color/grays), 640 x 780 (16 grays), 512 x 382 (256 colors) | no/ADB |
| 1MB–32MB | 6 (NuBus) | any/3½", 5¼" | 1.4MB | stereo/no | none | varies | no/ADB |
| 128K | 0 | none | 400K | mono/no | b & w | 512 x 342 | yes/RJ-11 |
| 512K | 0 | none | 400K | mono/no | b & w | 512 x 342 | yes/RJ-11 |
| 512K | 0 | none | 800K | mono/no | b & w | 512 x 342 | yes/RJ-11 |
| 1MB–4MB | 0 | none | 800K | mono/no | b & w | 512 x 342 | yes/RJ-11 |
| 1MB–4MB | 1 (SE direct) | any/3½" | 800K, 1.4MB | mono/no | b & w | 512 x 342 | no/ADB |
| 1MB–32MB | 6 (NuBus) | any/3½", 5¼" | 800K | stereo/no | none | varies | no/ADB |
| 1MB–32MB | 6 (NuBus) | any/3½", 5¼" | 1.4MB | stereo/no | none | varies | no/ADB |
| 1MB–32MB | 3 (NuBus) | any/3½" | 1.4MB | stereo/no | none | varies | no/ADB |

Price pressure from the IIsi below and the IIci above will surely squeeze the IIcx out of the Macintosh family. But there's quite a large gap in price between the IIci and the IIsi. Too bad Apple didn't lower the price of the IIcx and perhaps bundle a video board to fill that gap.

The fastest, most expandable, and costliest Macintosh remains the Mac IIfx. On average, it's 7 times as fast as the Classic, 2 times as fast as a IIsi, and 1.7 times as fast as a IIci (without static RAM cache). The Mac IIfx comes equipped with six expansion slots, one of which must be used for video. Configured with 4MB of RAM, an 80MB hard drive, a keyboard, an 8-bit video board, and Apple's 13-inch color monitor, a Macintosh IIfx system lists for about $11,700. Dealer discounts should bring the street price of that system to about $7900.

### Portable and Transportable

When you think Mac II, the last thing to come to mind is portability. But the new Mac IIsi and the Mac LC are smaller and lighter than the Mac Portable. In fact, you could just buy a keyboard, monitor, and power cord for your home and office, for instance, and easily carry the CPU itself back and forth. A IIsi with two keyboards, one color monitor, and one monochrome monitor costs no more than a Macintosh Portable (which like the IIfx and SE/30 hasn't changed in price). For $900 less than a Portable, you could buy an LC with two color monitors and two keyboards.

Before you place an order for a Macintosh LC or IIsi to carry back and forth daily, however, consider the hassle of hoisting monitors at each location and of disconnecting and reconnecting cables. Tedious? I should say so, and it wears out the connectors. The ADB keyboard connectors, for example, are rated at 500 mating cycles. They could wear out after a year of twice-daily moves. Maybe an enterprising company will remove these barriers by making a $700 flat-panel display that hinges to an LC or IIsi—fold it open for viewing, fold it closed for carrying—and a tote bag that packs everything without disconnecting any cables.

### Buyer's Guide

Given the many combinations of features, performance, and price, you might wonder which Macintosh is right for you. Below, I list the configurations that best suit a wide variety of users.

**General Office** For letter and report writing, basic information management, simple graphics, and elec-

# MAC Family

**Keyboard Included** One of the advantages of buying the new Macintosh Classic or LC is that both include this revamped keyboard in their purchase price.

tronic mail, a Mac Classic with a hard drive is adequate. Choose an LC or SE/30 if you write lengthy documents, perform extensive numerical analysis, use complex relational databases, or simply want a bigger screen.

**Education** Applying Apple's usual steep educational discount should make the price of a Mac Classic (without hard drive) as low as $500 for schools and colleges—very competitive for a 1MB system with built-in networking. Schools that use Macintosh and Apple II computers can get both in one Mac LC with an Apple IIe emulator board.

**Publishing and Presentations** For laying out small publications involving no color or at most spot color, an LC and a monochrome monitor will do. If you prepare color presentations, get the LC with the video SIMM and a 13-inch color monitor. You'll handle large publications more easily with a IIsi's faster performance and better video support. Connect Apple's full-page monitor or 13-inch color monitor directly or use the expansion slot for a 2-page display. If you need full 24-bit color, read on.

**Graphic Arts** An LC with a 12-inch color monitor meets the basic requirements. A IIsi gives you room to add full 24-bit color, which you'll want eventually. However, 24-bit color slows down the screen display quite a bit unless the 24-bit video board includes a graphics accelerator. You can't add a separate accelerator because you already have a 24-bit video board in the IIsi's one slot.

**Image Manipulation** Get the fastest Mac you can afford, at least a IIci and preferably a IIfx. Forget about built-in video because you'll be adding a 24-bit video board.

**Multimedia Viewing and Authoring** For viewing HyperCard productions, including those that use CD ROM, CD audio, or videodiscs, a Classic is fine. Viewing color productions will require at least a Mac LC with a 12-inch color monitor. Authoring requires more power than viewing. An LC with its built-in sound input makes a good choice for creating HyperCard, SuperCard, and Plus stacks. A Macintosh IIsi (which also has sound input) is a better development system for elaborate productions based on MacroMind Director.

**Family Computer** The LC is the best choice for an all-purpose family Macintosh. It can easily handle your personal business, the children's education, and everyone's games.

### Keeping Up with the PCs

Macintosh computers have always been considered expensive. Computer buyers and software developers have long clamored for a less expensive Mac but Apple has consistently turned a deaf ear. After all, the Macintosh had a unique graphical interface that made the computer easier to use, reduced training costs, and encouraged development of innovative application programs. These advantages made the Mac worth more.

Recent developments on other platforms have lost Apple most of those advantages. Microsoft Windows 3.0 software now provides IBM PC compatible computers with a very similar graphical interface. Software developers who were formerly dedicated to the Macintosh have started producing application programs for Windows 3.0. Additionally, Apple's dominance in the educational market has eroded from 70 percent in 1986 to 54 percent in 1989. Meanwhile, IBM's share of that market rose from 5 percent to 30 percent. Apple had to lower prices to remain competitive.

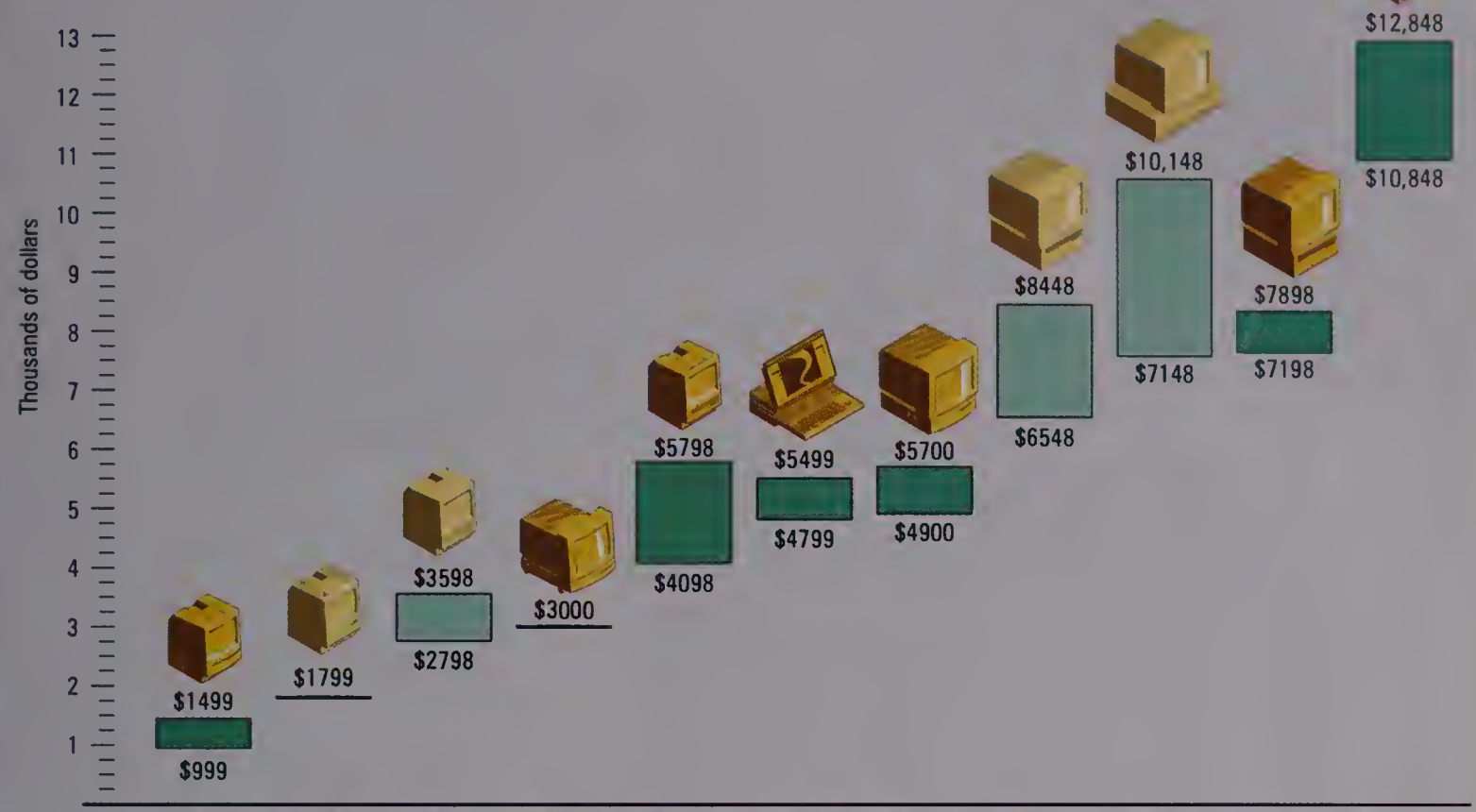
Except for the Classic, the new lower list prices for Macintosh computers are still high compared to IBM and Compaq computers. Anticipated street prices are competitive with those computers, but nobody can guarantee what street prices will be. To achieve low street prices, Apple must keep plenty of computers on dealers' shelves and give dealers large enough margins to leave room for adequate profits after discounts. Even at the proposed street prices, you will pay more for any Mac except the Classic and LC than for an inexpensive clone of an equivalent IBM computer.

### Why Buy a Mac?

People will continue to buy a Macintosh for reasons less objective than price. Compared to PC compatible computers that use Windows 3.0, all Macintosh models still have the following subjective advantages:

- Easier setup
- Better integrated system software for a more consistent interface among application programs
- Much larger assortment of application programs
- Superior display technology, including support for displays of any resolution; from two to millions of colors and gray shades; and multiple monitors (with different gray-scales or color depths)
- Sound output beyond an alert beep,

# Lower-Cost Macintoshes




| | Classic | Mac Plus | Mac SE | Mac LC | Mac SE/30 | Portable | Mac IIsi | Mac IIcx | Mac IIx | Mac IIci | Mac IIfx |
|---|---|---|---|---|---|---|---|---|---|---|---|
| RAM/Hard drive | 2MB/40 | 1MB/none | 2MB/40 | 2MB/40 | 4MB/80 | 1MB/40 | 5MB/80 | 4MB/80 | 4MB/160 | 4MB/80 | 4MB/160 |
| | 1MB/none | | 1MB/none | | 1MB/40 | 1MB/none | 2MB/40 | 1MB/none | 1MB/none | 1MB/80 | 4MB/none |

With the announcement of three new machines, the Macintosh family has undergone dramatic realignment. This table shows the relative prices for Macintosh systems that will be available after January 1, 1991 (in full color) and those that are being phased out (grayed out). Prices were calculated for full Macintosh systems and are generally expressed as ranges. For instance, the prices for the Macintosh Classic (keyboard included) range from $999 for the 1MB model to $1499 for the model with 2MB RAM and a 40MB hard drive. The prices for the Macintosh IIfx range from $10,848 for a model with 4MB RAM, no hard drive, a keyboard, monitor, and an 8-bit video board to $12,848 for a similarly outfitted model with a 160MB hard drive.

and sound input on the LC and IIsi

- The Apple Desktop Bus (ADB), which supports keyboard, mouse, graphics tablets, other input devices, and even a modem (suggested maximum of three devices per ADB port)
- SCSI port for chaining up to seven hard drives, optical storage, tape drives, and other devices (most PC systems use a separate slot for each storage device)
- Built-in, easy-to-connect local area networking for electronic mail and for sharing files, disks, printers, modems, and other resources

These advantages plus Apple's new lower prices will satisfy enough computer buyers to make sure the Mac retains its market share. To lure new customers, some people might suggest that Apple license its technology to clone makers so they can make cheap Macs. That's unlikely to happen because it would compound Apple's already difficult task of keeping system software compatible across all models. Other people might urge a more complete Mac family—maybe a faster version of the Classic, an SE/30 with a built-in color monitor, a cheaper 3-slot Mac II (a reduced-price, video-included IIcx), a cheaper 6-slot machine, a new top-end Mac based on the state-of-the-art 68040 processor, and hey, how about a lighter portable. For now, you have seven models to choose from, all but three priced surprisingly low. The reduced prices combined with the inherent advantages the Macintosh family has always enjoyed keep Macs competitive, even if most of them do still cost more than cheap IBM clones. ◻

See *Where To Buy* under Mac CPUs and Peripherals for contact information.

***Lon Poole** is a* Macworld *contributing editor who writes a monthly column,* Quick Tips

MAC

# Classic

**The Plus and SE will disappear, but the Mac Classic fills the void with the power of an SE at a price lower than the Plus's.**

The Macintosh Classic is very much what it looks like—the unexceptional progeny of a Mac Plus and an SE. All three have the same compact footprint, are light enough to carry from place to place, and have an integrated 9-inch black-and-white monitor. All three of the new Macintoshes use 8MHz Motorola 68000 microprocessors.

The Classic inherits its other features partly from the Plus and partly from the SE. The new machine has a single internal floppy disk drive, space for an internal hard drive, and an Apple Desktop Bus (ADB) connector for the included keyboard and mouse. There is no expansion slot. Performance is very similar to that of the four-year-old SE, with a few surprises (see "Ranking the Macintosh Classic"). The Mac Classic is noticeably faster than a Plus but even more noticeably slower than any other Macintosh.

What really sets a Mac Classic apart from an SE or a Plus is price. A Mac Classic with 2MB of RAM and an internal 40MB hard drive has all the most popular features of a Mac SE, and yet it lists for $1499—55 percent less than its predecessor. With no internal hard drive and only 1MB of RAM, a Classic is still faster and more flexible than a Plus, and it lists for $999 (a reduction of 45 percent).

Apple achieved these low prices by designing completely new circuitry, with cost reduction a top goal. The new logic board is about half the size of the older ones but includes all the standard features that Mac owners take for granted: a graphical user interface in ROM, a SCSI port, two serial ports, AppleTalk networking, sound output, and memory expandability. ROM capacity is 512K on the Mac Classic, but the contents are basically the same as the Mac SE's 256K ROM (Apple uses the larger ROM because it's cheaper). "Classic Logic" shows the logic board, and "Behind a Classic" shows the port configuration.

Another circuit board, called the analog board, contains video circuitry and a power supply. The Classic's analog board bears a

BY LON POOLE

PHOTOGRAPHS BY MARK JOHANNI

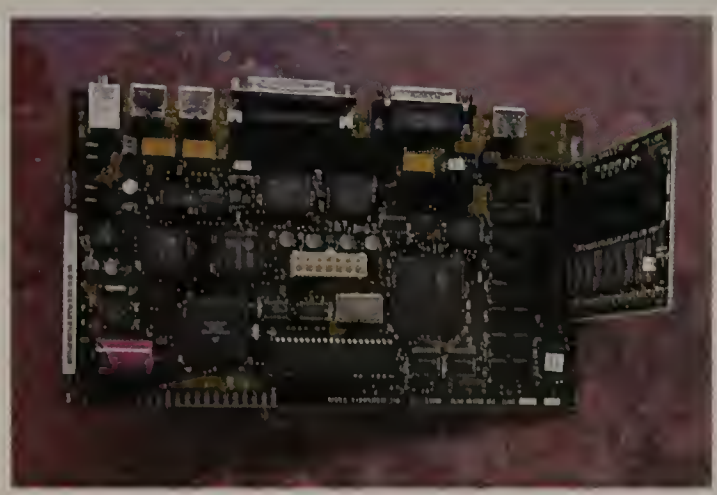
File Edit View Element Type Fill Line Color
Pointing devices
Macintosh Classic

superficial resemblance to the Mac Plus's but is completely new. Unlike the power supplies in all other Macs, which automatically adjust to any AC voltage in the world, the Classic's power supply works only with the voltage of the country in which it was designed to be sold.

### Memory

The new logic board has 1MB of RAM soldered onto it. Another optional 1MB of RAM is soldered onto an expansion board that stands vertically in a special socket at the right rear corner of the logic board. The expansion board also has two standard SIMM sockets. Possible memory capacities are 1MB (no RAM expansion board), 2MB (expansion board with no SIMMs), 2.5MB (256K SIMMs), and 4MB (1MB SIMMs). A Mac Classic can't use 4MB SIMMs.

Apple sells the Classic with either 1MB of RAM for those who don't need System 7.0, or 2MB of RAM for those who do. In addition, using System 7.0 will certainly require two disk drives, one of them preferably a hard drive.



**Classic Logic** The Macintosh Classic's logic board is smaller and has fewer parts than the Macintosh Plus and SE. The reduction in size and parts count keeps costs down and performance up.

**Behind a Classic** The back panel of the Mac Classic includes (from left to right) a single ADB connector for keyboard and mouse; a floppy disk drive port; a SCSI port for hard drives, scanners, some printers, and so on; a serial port designated for modem use; a serial port for a printer or an AppleTalk network; and an audio output jack. There is no SE-style removable panel for connecting to internal plug-in boards because the Classic has no internal expansion slot.

### Disk Drives

The Classic includes one internal floppy disk drive and has room for an internal hard drive. The floppy drive is a SuperDrive like the one installed in all present-day Macintoshes except the Plus. It stores 1.4MB on high-density disks, 800K on standard-density double-sided disks, or 400K on single-sided disks. This drive also reads, writes, and formats MS-DOS and OS/2 disks from PC compatibles, and ProDOS disks from Apple IIs. You can't install a second internal floppy disk drive in a Mac Classic, as you can in an SE.

The internal hard drive mounts above the floppy drive. The Mac Classic is designed to use one of the relatively new one-third–height, 3½-inch hard drives. These are not presently available in as many capacities, or in as high a capacity, as the standard-height 3½-inch drives used in an SE. More variety is sure to become available.

It will be harder, though not impossible, to mount an internal hard drive vertically in the right-rear quadrant of the Classic case, as you could do in a Plus or SE using non-Apple products. The Classic's RAM expansion board sticks up into that area.

### Miscellany

The Macintosh Classic has a few other new features in addition to its appearance, compact hard drive, and circuit board design. It comes with a new type of ADB keyboard that looks like the standard Mac ADB keyboard most people use with an SE. The new keyboard has a slightly different key layout, and when you type the keys feel stiffer than on previous Mac ADB keyboards. The new keyboard has a two-position tilt adjustment, and you can plug the included ADB mouse into either the right or left side. *Macworld* editors who tried the new keyboard liked it better than the Mac Plus keyboard and felt neutral about it compared to other Macintosh ADB keyboards.

You control brightness of the display screen with the Control Panel, not with a knob under the screen. The audio jack outputs two-channel monaural sound at levels compatible with most headphones. (On a Macintosh Plus or SE, one channel is dead, and the other is too loud for most headphones.) A fairly quiet, constant-speed fan sucks air through a vent in the bottom of the Classic. There are no vents on top, so you can stack papers there without worrying about overheating the Classic.

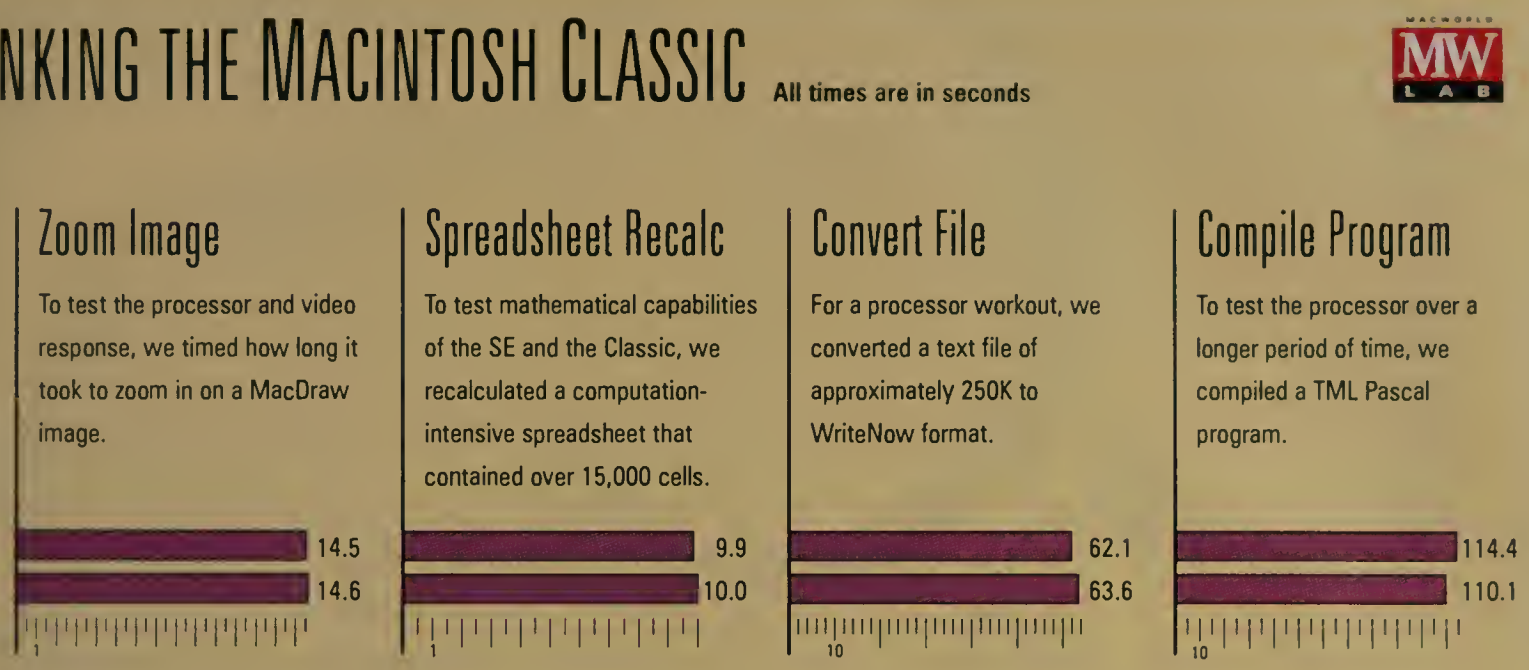
### Value

The features and capabilities of the Mac Classic are far less interesting than its price. The cheapest retail configuration—1MB of RAM, the new ADB keyboard, and a 1.4MB SuperDrive—lists for $999. Competition among dealers could drive the price even lower. Although the Mac Plus has been advertised for less than $900 in recent months, the basic Mac Classic is a better deal because it's faster and it includes a more flexible floppy drive, an ADB port, and space for an internal hard drive.

A second Mac Classic configuration has all the features of the basic configuration plus 2MB of RAM and an internal 40MB hard drive. The list price is $1499, and the price could go lower with dealer discounting. That's certainly a good value compared to

## Ranking the Macintosh Classic

All times are in seconds




In all of Macworld Lab's speed tests, the Macintosh SE and the Macintosh Classic came out nearly even. Apple hasn't traded off any performance in making this low-cost 68000-based Macintosh.

an equivalently configured Mac SE, which has been selling recently for around $2300. The SE's expansion slot, its only advantage over the Classic, is not worth $800.

These low prices make the Mac Classic very competitive with low-end PC-compatible computers. You'll pay less for a Mac Classic than for a roughly equivalent PC compatible. (A typical low-end PC has a 12MHz Intel 80286 microprocessor, 1MB of RAM, a 1.4MB floppy disk drive, two serial ports, one parallel port, and a keyboard.) To make it as close as possible to a Mac, you must add a mouse, a VGA monitor, Windows 3.0 software, and possibly a 40MB hard drive. The low-end PC system works faster than a Mac Classic and has a larger display area. On the other hand, the Classic includes a SCSI port for chaining multiple external devices, AppleTalk networking, sound output (beyond a simple beep), and a better graphical interface.

With a machine as stripped-down as the Mac Classic, the question of expandability is inevitable. You can expand the Classic's RAM, though only to 4MB, and you can install an internal hard drive. In addition, you can attach up to seven external devices to the SCSI port (hard drives, a scanner, a tape drive, a high-resolution printer, and so on). The lack of an expansion slot won't matter to most people. According to an Apple survey, the slots in over 90 percent of SEs are empty. Besides, you'll be able to upgrade a Classic as people now upgrade a Plus, by clipping a circuit board onto the 68000 microprocessor. Two companies—Dove and Total Systems—that make accelerators for the Plus are already revising them to work on the Classic.

Performance is the Classic's weakest characteristic. Although it's faster than a Plus, it is mediocre by today's standards (see "Ranking the Macintosh Classic"). At a time when low-cost PC compatibles are getting faster, Apple has given us classic performance from 1987. The Classic would be better prepared for the future if it had a faster microprocessor, like the 16MHz 68000 in the Mac Portable. Extra power could come in very handy when System 7.0 arrives and spawns increasingly complex application programs.

With the Classic, Apple has redefined the minimal Macintosh upward from the level of a Mac Plus nearly to the level of a Mac SE. That's pretty basic compared to the rest of the Macintosh family, but it is enough for word processing, spreadsheets, flat-file databases, black-and-white graphics, and even low-level desktop publishing. The Classic is a much better value than the Plus or the SE and should quickly replace them on dealers' shelves. (Apple will continue to sell the older models as long as demand warrants.) It's priced competitively with PC-compatible computers having similar capabilities, so it should help Apple increase its market share at the low end. The Classic is not enough Macintosh for a lot of people, but it is a very good value for people with basic needs and a tight budget. ◻

See *Where to Buy*, under Mac CPUs and Peripherals, for contact information.

*Contributing editor* ***Lon Poole*** *hasn't been able to settle down with one Macintosh model since he began writing about the Mac in 1983. He has a Mac IIcx with two video boards and an old Mac Plus, but not for long*

MAC

# LC

**What's been missing from the Macintosh line? The reasonably priced Macintosh LC with 16-bit color and Apple II emulation abilities.**

On a bright, hot morning in August, a vanload of *Macworld* editors trekked 50 miles down the coast from San Francisco to Apple's Cupertino headquarters. Our sources at Apple had hinted that we would see three new Macintoshes.

One would be a low-cost replacement for the Plus and SE. The second, a high-performance, one-slot Mac II; and the real kicker, a low-cost color machine for schools, homes, and small businesses. When we walked into the meeting room, we could see that our sources hadn't led us astray—three lumps sat concealed on a table, covered with bedsheets.

We didn't have to wait long before the covers were whisked off. The Mac on the left looked like a Macintosh SE but sleeker. The one on the right looked like a Macintosh IIcx on a diet. But whoa, check out the machine in the middle. This one, the Macintosh LC, sports a chassis so slender it could easily be mistaken for a 3½-inch hard drive. Small feet tilt it slightly upward, making the floppy-disk slot accessible over the keyboard. A 12-inch color monitor sits on top of the chassis; the whole bundle forms a smooth cube. As new as it looks, this newest member of the Mac family is also a blast from the past—later we'll see an old Apple II game, Raster Blaster, running on it.

Is this the low-cost, color Mac that users have been waiting for? It's small, it has 8-bit color built in, and it's 56 percent cheaper than the original Macintosh II. So what has Apple left out? Is this really the good deal it appears to be?

### The Basics

Packed inside the sleek, 3-inch-high chassis of the Macintosh LC is a 68020 processor running at 16MHz—the same setup found in the original Macintosh II but later abandoned for faster 68030-based processors. Despite the antiquity of its main engine, the Macintosh LC includes some of the more advanced features found in the Macintosh IIci—built-in 8-bit graphics display hardware, and 512K ROM chips with 32-bit QuickDraw built in, for example. The Macintosh LC also comes with 2MB of memory on the main logic board, a 40MB internal hard drive, and a 1.44MB floppy drive. (Buyers for primary and secondary schools can get a single- or dual-floppy system without a hard disk.)

Here's something new: a small, round, platinum-colored microphone and a stereo jack for MacRecorder-quality sound *input*.

PHOTOGRAPHS BY MARK JOHANN

BY CHERYL SPENCER

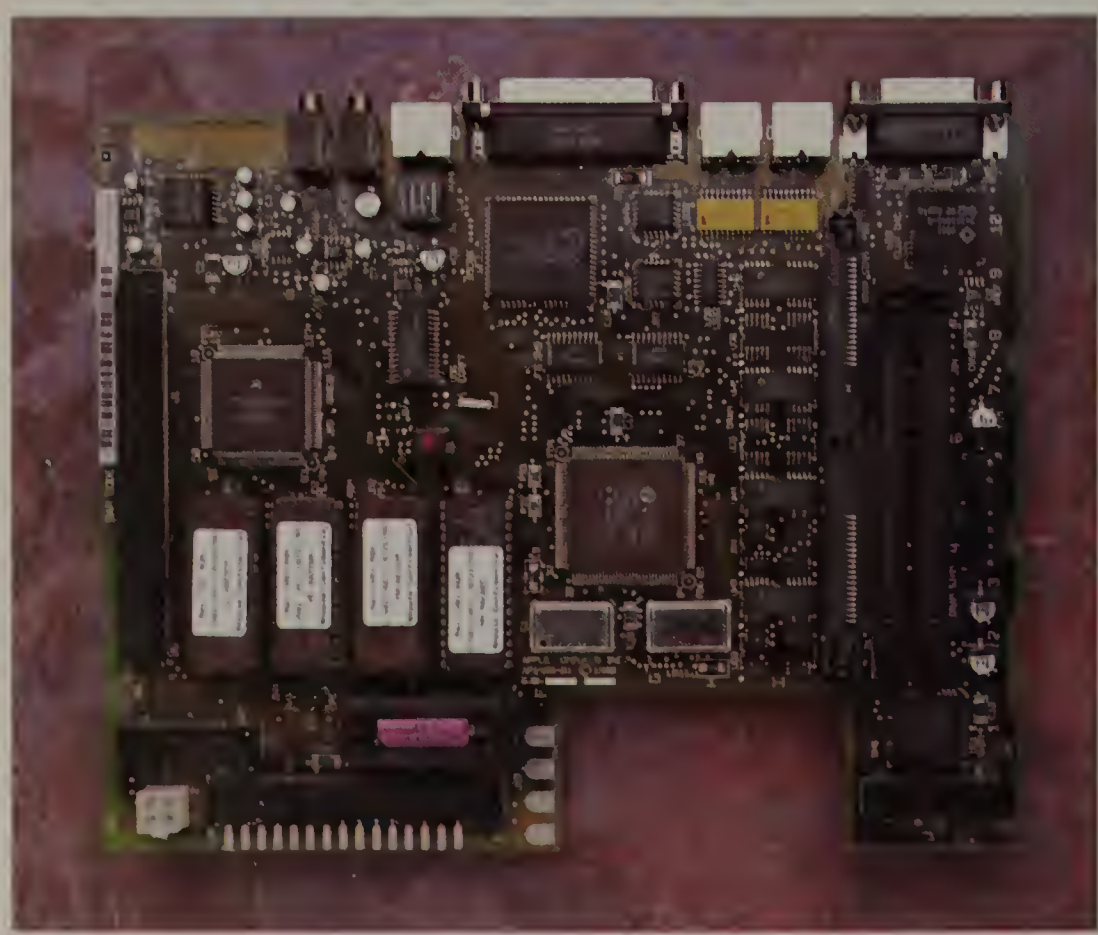
Pointing devices
A
B

Now when we talk to our Macs, they'll actually listen. And at long last, Apple includes a standard keyboard in the box. Is the Macintosh LC holding up to its promise? So far, yes.

Apple hasn't provided much room for expansion, however. The Macintosh LC has only one slot for adding networking, video, or high-resolution–display boards. Although it is processor direct like the one in the SE/30, this slot uses a different set of signals. Thus the Macintosh LC is not compatible with any currently shipping add-in boards. Users (and developers) now have a seventh slot standard (including the one for the Mac IIci cache) to reckon with. Also the Macintosh LC lacks the space for an optional 68881 or 68882 math coprocessor. (This may mean compatibility problems with some applications when the Macintosh LC first ships. In our tests of a preproduction unit, neither Excel nor Microsoft Works' spreadsheets would run, since the code for both programs is written to expect any Mac with a 68020 processor to also have a math coprocessor. Microsoft should be able to easily rework the code, however.)

The Macintosh LC's small size means that only 3½-inch, one-third–height (1-inch) drives can be placed inside. Only a few manufacturers currently make drives in this size, and they max out at 45MB. Quantum may soon make these small drives in capacities of 50MB and 100MB. Of course, the Macintosh LC supports external hard drives, which range in capacity from 20MB to 1 gigabyte.

For all its limitations, the Macintosh LC is Apple's least-expensive color Macintosh. The chassis lists for $2400 and the newly designed 12-inch RGB display lists for $600. That's a total of $3000 for a complete system—more than $3500 under the price of an original Macintosh II. When the Macintosh LC finally ships (Apple promises that will be sometime in January of 1991), street prices for a complete color system are expected to go as low as $2200, and educational discounts should allow schools to buy the Macintosh LC for even less.



The oddly shaped logic board is 7 inches long by 9 inches wide—the cutout is 1½ by 2½ inches. Except for the ROM chips, all of the logic board's components are soldered on, even the standard 2MB of memory (memory chips are highly reliable so this shouldn't be a problem). The board contains 26 chips.

**Monitor Options**

The Macintosh LC supports three different monitors: a 13-inch color monitor, a new 12-inch color monitor, and an updated version of Apple's 12-inch monochrome display. The least-expensive choice, the 12-inch monochrome monitor, costs about $300 and, with the CPU's built-in video board, displays 16 levels of gray. It offers a resolution of 640 by 480 pixels, which translates to 76 dpi.

Another $300 buys Apple's new 12-inch color monitor, which in its standard configuration displays 256 colors. Confusingly, this monitor has a lower resolution than the 12-inch monochrome—512 by 384 pixels. This is a little more than the number of pixels in the original, 9-inch built-in monitors (512 by 342), only spread over a larger area. Apple offered a classic "it's not a fault, it's a feature" argument on this point, claiming that studies the company has done show that users prefer lower-resolution color monitors. Presumably, what Apple means is that some people find they can read text more easily when it's blown up from the 72-dpi screen standard to the 12-inch color monitor's actual resolution of 64 dpi.

The new 12-inch color monitor is quite sharp. Based on a tube from Mitsubishi, it seems to live up to the quality we've come to expect from Apple's Sony Trinitron–based 13-inch RGB display. Brightness and contrast controls are located on the right side of the monitor, within easy reach. In the back of the monitor are controls for image height and vertical and horizontal skew. Adjusting these controls requires using a special plastic-coated alignment tool, but at least a technician can access them without removing the monitor casing.

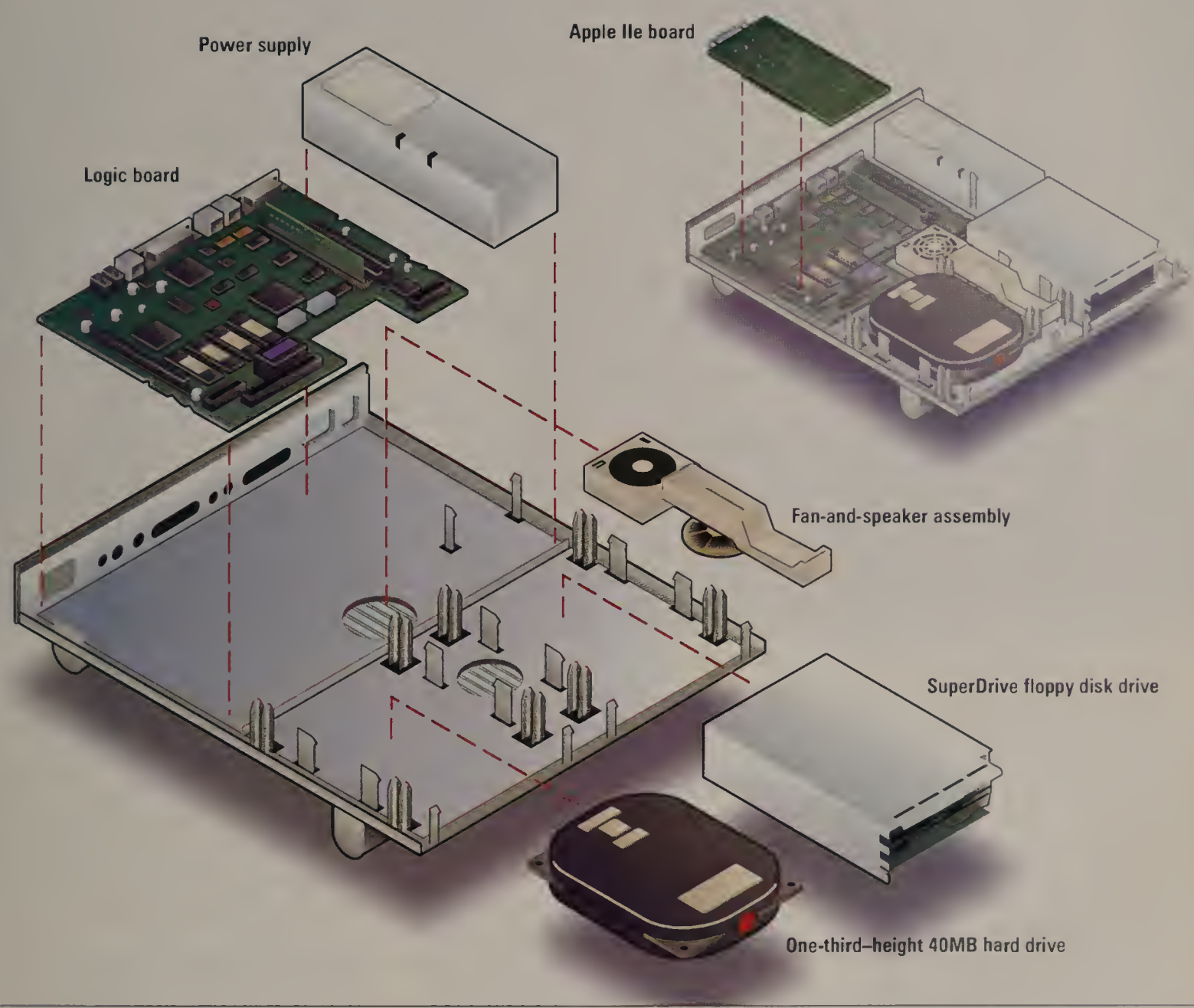
The other monitor option is the AppleColor High-Resolution RGB display. This 13-inch display has the same number of pixels as the 12-inch monochrome, 640 by 480. One disadvantage to this monitor is that the 13-inch display monitor doesn't fit as perfectly on top of the Macintosh LC chassis as do the 12-inch-display monitors. In addition, the Macintosh

# Inside the Macintosh LC

The Macintosh LC was designed to be manufactured quickly and inexpensively. Five basic components—the logic board, the power supply, a fan-and-speaker unit, a 40MB hard drive, and a SuperDrive floppy drive—can be snapped into the plastic case by robots. The Macintosh LC uses only four cables to connect components. These cables can also be inserted by robots.

## Adding a Board

A board such as Apple's IIe board connects to a new-style processor-direct slot on the Macintosh LC's logic board. An add-in board runs parallel to the logic board.




LC's built-in video circuitry, with its 256K of video RAM (VRAM), supports only 16 colors when used with the 13-inch color monitor. And the 13-inch RGB monitor costs $400 more than the 12-inch color monitor.

Apple will sell a board with 512K of VRAM for about $200 that can upgrade any of the three monitors. With the VRAM board, the monochrome monitor can display 256 gray shades, and the 13-inch RGB monitor can display 256 colors or grays. The 12-inch color monitor with the video upgrade will display 32,000 colors. While that's not as many as the 16 million that a 24-bit adapter can display, it is realistic enough for most uses.

### Memory and Sound

Apple's stated goal for future products is to establish a base level of performance that software and hardware developers can expect when creating new products. Eventually all Macs will have at least 2MB of memory, a hard drive, and sound input and output capabilities. This exactly describes the Macintosh LC.

The Macintosh LC ships standard with 2MB of 100-nanosecond memory soldered onto the main logic board. The board includes two additional slots for SIMM chips. Each of these slots must be filled in order for the

# MAC LC

Macintosh LC to recognize the memory. Adding two 1MB SIMMs gives the LC a total of 4MB of memory; adding two 4MB SIMMs gives it a total of 10MB of memory. Apple claims that third-party vendors will come out with a special SIMM that will permit a fourth memory option of 6MB total.

Although Apple has always included a speaker in its Macs, with the Macintosh LC and IIsi it is supporting sound input for the first time ever. But unlike the high-performance Macintosh IIsi, the Macintosh LC uses only 8-bit sound. This MacRecorder level of quality is intended primarily for applications using voice, such as voice-annotated E-mail; it is not going to make the grade with users who need 16-bit, CD-quality sound.

The Macintosh LC also lacks the Apple sound chip found on the Macintosh SE and Macintosh II family. As a result, the sound input and output on the Macintosh LC is monophonic only; the Macintosh IIsi has more realistic stereo sound. A new DFAC chip provides amplification, analog-to-digital conversion, and filtering. Apple claims that the filter allows the Macintosh LC to maintain the same sound fidelity as the Macintosh II even without the Apple sound chip. For voice recording, it doesn't matter that the Macintosh LC's fidelity is not as good as that of a Macintosh II or that sound is mono only. It's hard to imagine anyone trying to produce professional-level sound on the Macintosh LC with its slow processor and limited video slots.

On the positive side, a headphone jack now allows a mono signal to play in both ears, and an adapter allows stereo input to be heard as mono. And with these new Macs, a CD player can be hooked to the sound-in port and the CD sound can be heard with headphones via the sound-out port or through a speaker—while still allowing the Mac's various beeps to be heard. (For more on sound capabilities in both the Macintosh LC and the Macintosh IIsi, see the sidebar ["Breaking the Sound Barrier"] in "Mac IIsi," in this issue.)

### Running Apple IIe Programs

One of the most interesting things about the Macintosh LC, though—and one of the main reasons that Apple is targeting it heavily toward schools and homes—is that it can run Apple II and IIe software (but not Apple IIGS software). By March of 1991, Apple will ship a special Apple IIe emulator board that plugs in to the direct slot; it will cost about $250. (Although the name is not yet formalized, Apple insists that the board will not be called an emulator, and, in fact, requests that we refer to it only as the Apple IIe

## INSIDE THE APPLE IIe BOARD

To get the Apple IIe board to work, the Mac's hard disk must be partitioned into two volumes—one to hold the ProDOS operating system, the other to hold the Mac Operating System. The Macintosh LC's SuperDrive can read and write both Mac floppies and 3½-inch Apple IIe floppies. To read 5¼-inch Apple IIe floppies, however, an external 5¼-inch disk drive must be attached to a port on the Apple IIe board. Connecting a y-cable enables the same port to also run a joystick. Apple claims that by the time the Macintosh LC ships, clicking on Apple-supplied software will start ProDOS.

Apple has taken great pains to get this sort of tight integration between the Macintosh LC and the Apple IIe board. Apple had thought that it might be able to emulate an Apple IIe via software. But the performance lagged. A complete hardware solution—basically building a IIe into the LC—would have boosted the machine's price out of range of most home or education buyers and it would not have been flexible enough to support future features such as cut-and-paste between Mac and Apple IIe programs. So Apple compromised, coming up with an ingenious hardware-and-software solution that allows full performance at a reasonable cost.

The Apple IIe board contains both a 65C02 processor, which runs Apple IIe programs, and 256K of memory. Half of the memory is used as standard Apple IIe memory (upping an Apple IIe program's allotted memory in the Mac's Get Info box enables the application to use the Macintosh LC's main memory as expanded Apple IIe memory). The other 128K contains an image of the Apple IIe ROM—the ROM is, in fact, one of the few chips missing on the Apple IIe card.

Thanks to a clever design, the Apple IIe card not only runs Apple II programs and peripherals, but it also allows programs to use the Mac's peripherals. For instance, any Apple II program can use the Mac's mouse as if it were an Apple IIe mouse. When an Apple IIe program starts to look for a mouse, or for any hardware that might normally be attached to (or in) an Apple IIe, special circuitry in the IIe board stalls the 65CO2 processor and lets the software in the Macintosh LC know that the IIe program is trying to access the IIe hardware. The software in the Macintosh then reads or writes the same data that the IIe would have seen if the hardware had been present. With this scheme, the IIe board should work with almost all Apple IIe software, even programs that access IIe hardware directly.

Some IIe firmware calls are modified to communicate directly with the Mac software. These calls from the IIe program are mapped into a special device handler on the LC. The handler translates the calls and goes to a predesignated place to get the information the program needs. For instance, the handler might go to the LC's mouse port, grab information, and send it back to the program; from the program's point of view, the data appears as if it came from a IIe mouse.

A similar design lets the Macintosh LC run all of the Apple IIe's different video modes. Each display mode acts differently—text mode generating only text, low-resolution mode supporting more colors than single hi-res, and double hi-res taking two screen buffers of single hi-res mode and interleaving them byte by byte to get the best resolution (for the Apple IIe, that's 560 by 192). And each of those modes acts differently from a Macintosh LC display.

The Apple IIe card, however, doesn't generate any video. Instead, it provides a value in a status register whenever the IIe alters the data in its video buffer. The Macintosh LC software, upon noticing this alert, determines the address and data stored in the IIe display buffer and draws the equivalent image on the Macintosh LC's screen. The Macintosh software can also look directly into the video buffers on the Apple IIe card and see what information is stored there. The software determines what dot pattern the information represents, and then goes to the Macintosh screen and paints an equivalent image.

To illustrate just how much engineering cleverness went into making this scheme work, take a look at what happens during a typical scroll. The Apple IIe board tries to access an Apple IIe screen—which is not there. Now this might not be such a big deal except that the Apple IIe uses hardware character generation, that is, for every character that is written on the screen, the Apple IIe sends an ASCII code to a text screen buffer. The Apple IIe hardware generates a bitmapped version of the character and sends it to the screen. The Mac, on the other hand, draws each Apple II text character as a bitmap that is 3.5 bytes wide and 16 bytes high. Thus the Mac must draw about 56 bytes of information for each 1-byte text charater that the Apple IIe stores. Yet the Apple IIe programs we saw running on the LC worked smoothly.

A large part of the reason Apple can supply such good Apple II and IIe emulation on the Macintosh LC is that Apple IIGS engineers helped. For instance, there are only a few ways to enable copy protection on Apple IIe 3½-inch floppies. Since the Apple IIe engineers knew all of those ways, they engineered the board to work with those schemes—a feat that would have been nearly impossible for an outsider to achieve in a reasonable amount of time. As a result, only a few very esoteric games refuse to run.

This slender Mac measures only 3 inches high by 12.2 inches wide by 15 inches deep. The case's top pops off like the one on the IIci.

The Macintosh LC includes a connector for an external floppy disk drive, two serial ports, a SCSI connector, an AppleTalk connector, audio-in and audio-out ports, and a space for the optional Apple IIe board.

option board. The company is still gun-shy about earlier third-party emulation boards that did not work.)

When Macworld Lab tested the Macintosh LC in August, the Apple IIe card was still in prototype stage, so we couldn't run any speed tests on it. But Apple did run several Apple II and IIe programs; they all worked well, at the full Apple IIe 1MHz speed. The Apple IIe card can run at 2MHz (the Apple IIc's speed), but the beeps sound wrong and some timing-dependent applications (such as games) may refuse to run.

To prove that the Apple IIe option board was designed for ultimate compatibility, Apple ran BudgeCo's Raster Blaster, an old Apple II pinball game that was written in assembly language and would be incredibly dull to play if it were not running at full speed with all its graphics, sound, and animation intact. Apple seems to have done its homework. It may have scrimped on expandability features for the Macintosh LC, but it's gone full-bore on the Apple IIe card. Pull out those old Apple II disks—Apple's betting that they'll run on this board.

### Other Uses for the Direct Slot

Not everyone will want to use the processor-direct slot for Apple IIe emulation. When the Macintosh LC ships, Apple will offer an Ethernet board for users who want to connect to a network that's faster than AppleTalk (approximately $400 for the board and the transceiver box). Third-party vendors are expected to announce options such as token-ring boards, 3270-emulation boards, internal modems, and larger monitors. Apple admits that this new one-slot Macintosh opens the door for vendors to create multifunction boards that will, say, offer support for a 19-inch display and live video on the same board.

What about speeding up the 68020 processor or upgrading for System 7.0 virtual capability? Apple won't provide a 68030 upgrade option or a math coprocessor, although the company has implemented the signals needed to make a math coprocessor run. Apple hints, however, that third-party vendors are working on accelerators with math coprocessor options—and these accelerators may not even use the processor-direct slot.

The only limitation on the types of boards that will work on the Macintosh LC is how much power they draw. The Macintosh LC's power supply has 4 watts left over for add-in boards after supplying power to the rest of the system. This compares with 15 watts per slot on the three-slot Macintosh IIcx. VLSI technology is improving, however; RasterOps has already produced a 24-bit board with an accelerator (the 24s) that draws only 4.5 watts.

### It Stands for "Low Cost"

For the Macintosh LC's power supply to be beefier, it would have to be physically bigger. And if the power supply were bigger, the Macintosh LC's case would have to be bigger. If the case were big enough to support a heftier power supply, then why not add a few more slots? Pretty soon, users would come full circle, back to the Macintosh II with its greater expandability—and higher price.

To make a product that fits into its current lineup, Apple had no alternative but to downsize compo-

# Ranking the Macintosh LC

All times are in seconds

## Fit Image to Window

We resized images in Claris CAD, MacDraw, and Illustrator to fit the Mac's window. (Times are averaged.)

## Preview Image

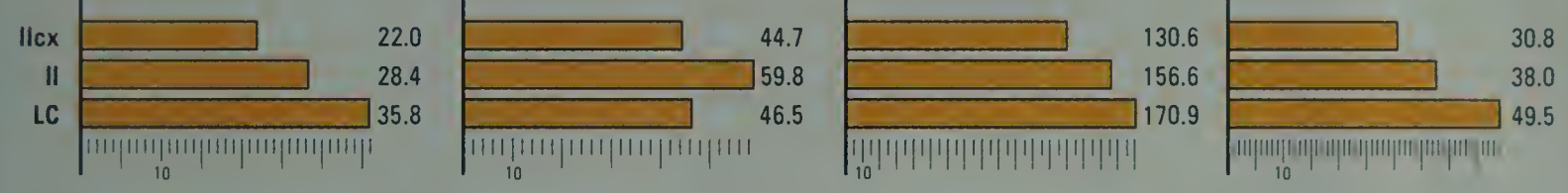
Previewing an image exercises the processor the same way Fit Image to Window does, but we got very different results. We timed Illustrator for this test.

## Redraw Image

Redrawing a ModelShop image gave us results consistent with the Fit Image to Window test.

## Convert File

Converting a 250K text file to WriteNow format also gave us results consistent with the Fit Image to Window test.




Although the Macintosh LC's processor is similar to the Macintosh II's, the Macintosh LC has only a 16-bit data path compared to the Macintosh II's 32-bit data path. Thus, many operations are a bit slower on the Macintosh LC than on the Macintosh II.

nents and simplify the whole shebang into a nice, compact package—even though that meant crippling some of the features of the original Macintosh II. For instance, the Macintosh II's 68020 uses a 32-bit data path to move data into and out of the processor. The Macintosh LC, on the other hand, uses a 16-bit data path. Fortunately, this doesn't slow the processor's performance very much at all (see benchmarks). In order to process 32 bits, Apple would have to use two ASIC chips; to process 16 bits, Apple needs to use only one ASIC chip (the limiting factor for an ASIC is the number of pins it can hold). The fewer the chips, the smaller the board; the smaller the board, the cheaper it is to manufacture.

Likewise, the reason users have only one configuration option (two, counting the floppy-only system for schools) is so that Apple can keep production costs down. A Macintosh LC has only five main parts to assemble (see "Inside the Macintosh LC") and only four connectors to attach. For Apple, there's no time-consuming and costly switching between assembly lines configured for Macintosh LCs with varying amounts of memory and hard drives with different capacities. So except for schools, buying a Macintosh LC means buying an Apple 40MB hard disk, like it or not.

### I'll Take One

Is the Macintosh LC a product that users want? Does the lack of Mac IIci-class performance and expandability tarnish the temptation any? To both of these the answer is yes and no. The price is certainly attractive and the Mac LC's sleek, small case design is endearing. Performance is more than adequate, if not startling. Weighing in at 8.8 pounds including the hard disk, the LC cries for a 2-pound flat-panel display. Pack the whole thing together and the LC becomes an 11-pound portable (minus, of course, a battery for cordless operation).

The Macintosh LC will be a winner in businesses, homes, and schools. In business, the Macintosh LC belongs on the desk of the many people for whom a Macintosh II offers sufficient power and more than enough expansion slots. In the home, the Macintosh LC is appropriate for users who want a Macintosh as an extension to school or work. Folks with children who use an Apple IIe at school will be especially tempted.

As for the education market, the Macintosh LC has tougher competition. Universities may want more power and expandability than the Macintosh LC offers—especially if they are connecting to a UNIX network or doing multimedia work. But for K-through-12 schools, the Macintosh LC, with its Apple IIe board and low-cost color, is a good deal. Apple claims that the Macintosh LC will sell to schools for the same price as—or even less than—an Apple IIGS.

Now more than ever, it makes sense for Apple to phase out the Apple IIGS and maybe even the Apple IIe. The Macintosh LC is designed so that it can be assembled completely by robotics once the production volume is up enough to justify it. Currently, only Apple's manufacturing facility in Singapore has experience assembling machines with no human contact—and that's on the Apple IIGS line. Couple that with the Macintosh LC's expected price equivalency to the Apple IIGS for schools, and the no-holds-barred approach Apple took to enabling complete Apple II–compatibility, and it doesn't make much sense for consumers to choose an Apple IIGS.

Overall, the Macintosh LC is a winner. It's a solid machine with good performance and capabilities at an aggressive price. After several disappointing Macintosh introductions (most notably, the Portable and the Macintosh IIci), Apple has shown that it can still be innovative *and* competitive. ◻

See *Where to Buy* under Mac CPUs and Peripherals.

MAC

# IIsi

**With built-in video and the ability to input sound, the one-slot Macintosh IIsi offers the performance of a IIcx—and it costs $2000 less. Why, then, will some of us miss the Macintosh IIcx?**

High-end features for a midrange price—that was the design philosophy behind the Macintosh IIsi. The newest, smallest member of the Mac II family is faster than the Mac IIcx, which for all practical purposes, it replaces. It's elegantly engineered, with fewer components than a IIcx and a snap-together design that should make repairs easy and less expensive.

More important, the Macintosh IIsi lowers the cost of the Mac II line's most desirable attributes—a 68030 processor, support for 32-bit color and NuBus expansion boards, and stereo sound output. The IIsi doesn't even require that you buy a separate video board, thanks to built-in video circuitry similar to that of the costlier and faster Mac IIci. And the IIsi joins the new Macintosh LC in providing a microphone and built-in sound-recording circuitry (see "Breaking the Sound Barrier").

What does it cost? With 2MB of memory and a 40MB hard disk, approximately $3800. Throw in a standard keyboard and a 13-inch color monitor for a total of roughly $4900. That's about what a 2MB, hard disk–equipped Macintosh SE/30 cost prior to Apple's latest price cuts, and it's about 35 percent less than a similarly configured Macintosh IIcx. Your only other configuration choice is a Macintosh IIsi with 5MB of memory and an 80MB hard disk—that will cost about $800 more.

To learn where Apple cut corners in order to deliver a less expensive Mac II, start by counting expansion slots. The Macintosh IIcx and IIci each provide three slots (not counting the Macintosh IIci's cache board slot), but the Macintosh IIsi has just one. And for reasons I'll describe later, you need to spend an extra $249 for an adapter board before you can install any currently available board in that slot.

BY JIM HEID

PHOTOGRAPHS BY MARK JOHANN

SOJ SIMM
What's the difference between Dual In-line
Package (DIP) SIMMs and surface-mount
(SOJ) SIMMs? The answer is the size of the
chips and how they are attached to the SIMM
circuit board. Connections on surface-mount

But for many people, that won't matter. After all, many Mac IIs contain only one expansion board—a video board. Given that the IIsi already contains video circuitry, many people may not even need its single slot. But for anyone who wants to combine, say, 24-bit color and CD-quality digital sound, the IIsi is the wrong machine. Like a two-seater sports car, the Mac IIsi has plenty of horsepower, but little room for passengers.

**Behind the Macintosh IIsi** The back of the IIsi's case includes modem and printer ports, an external floppy drive connector, a SCSI connector, a stereo sound output jack, an audio input jack, and one Apple Desktop Bus (ADB) connector.

### An Appealing Profile

With its stylish, low-profile case, the IIsi weighs just 10 pounds and measures 4 inches high, 12.4 inches wide, and 14.9 inches deep. The machine fits nicely under a monitor and can support a 19-inch monitor such as Apple's Two-Page Monochrome Monitor. Alas, the machine cannot be set on its side the way a IIcx or IIci can.

Like the Macintosh IIcx and IIci, the Macintosh IIsi accommodates one internal SuperDrive floppy drive and one hard drive. The hard drive, however, must be a squat, one-third–height unit; the Mac IIsi's case isn't tall enough for the higher-capacity half-height units that other Mac IIs can accommodate.

Unfortunately, the IIsi—unlike most Macs with an internal hard drive—lacks a front-panel activity light that would let you know when the disk is being accessed. An activity light isn't required equipment, but it does help you know what the machine is up to. This omission, shared by the Mac Classic and LC, is another cost-cutting measure: the light itself isn't expensive, but the labor involved in routing the wire that connects it to the hard drive would have added to the cost of manufacturing. Apple should provide software for an on-screen disk-activity indicator—like the DiskLight software in Norton Utilities for the Macintosh.

The back of the IIsi's case sports the standard ports and connectors (see "Behind the Macintosh IIsi"). But like the Classic and LC, the IIsi offers just one ADB connector instead of the two that have been standard on all Macs beginning with the SE. That may disappoint fans of alternative input devices—it means you can attach just one additional input device beyond the keyboard and mouse. (Although the ADB supports up to 16 devices, Apple recommends against connecting more than 3 to one ADB connector because of signal degradation in the cabling.)

Like other Mac IIs, the IIsi starts up to the chord of a steel guitar when you press its keyboard's power-on key. Supplying the juice is a 47-watt power supply—a lightweight compared to the 230-watt supplies used in the IIx and IIfx and the 90-watt supplies in the IIcx and IIci. But remember, the IIsi has fewer internal components, and it supplies power for just one expansion board, not six or three.

Nonetheless, Apple has identified a few high-end, third-party video boards that draw more power than a single NuBus board should. For such a board, Apple recommends that the developer indicate in the manual that the board requires the power of two NuBus slots. The moral: Before buying a high-end video board for a IIsi, verify that the IIsi can accommodate its power requirements.

The IIsi is cooled by a small, single-speed fan that Apple claims is among the quietest it has offered. A locking power switch like that of the IIcx and IIci lets the IIsi turn itself back on after a power failure. Unlike the Macintosh LC, the IIsi provides a power connector that will also switch on a monitor.

The Macintosh IIsi's speaker faces the bottom of the case, as it does in the Mac LC. That location doesn't help the IIsi's sound quality, but it is adequate for voice—which is all a 2½-inch speaker is good for anyway.

### In the Chips

The IIsi's surprisingly small logic board showcases Apple's prowess at creating custom integrated circuit chips that do the work of numerous off-the-shelf components (see "The Macintosh IIsi Logic Board"). The IIsi's low chip count is more than an engineering achievement—it means the machine costs less to build and contains fewer components to break.

Driving the Mac IIsi is a Motorola 68030 processor running at 20MHz—a pace almost midway between the IIcx's 16MHz clock rate and the IIci's 25MHz. Apple representatives say that cost was the main reason Apple didn't use a 25MHz 68030 in the IIsi, but it's clear that the 20MHz clock rate also helps the machine fit more neatly into the Mac product line. The 68030's burst mode is implemented to allow

## BREAKING THE SOUND BARRIER

Macs have been capable of playing digitally recorded sound since the days of the Macintosh 512K, but they've lacked the audio circuitry and analog-to-digital converter required for recording sound. Users wanting to add sounds to HyperCard stacks, presentations, or the System file have had to resort to third-party products, usually Farallon Computing's MacRecorder.

The Macintosh LC and IIsi change all that by providing built-in recording circuitry and a small microphone. Their recording features aren't going to supplant professionally oriented digital audio products like Digidesign's Sound Tools and Audiomedia, but they do give average users an easy way to add the dimension of sound to the Mac. And they spotlight Apple's desire to make sound more important.

Both the LC and the IIsi provide a three-conductor audio input jack that supplies power to the microphone, a sensitive electric condenser mike not much bigger than a large button. An adapter cable, available separately, lets you connect a stereo and other audio sources, and merges the left and right audio channels into a single channel.

Although the input circuitry supports monophonic recording only, Apple says stereo recording is possible by combining the built-in mike with MacRecorder. Farallon is tweaking its MacRecorder software to be compatible with the new machines; a prerelease version of the enhanced MacRecorder SoundEdit application was running on a IIsi at Apple's press briefing.

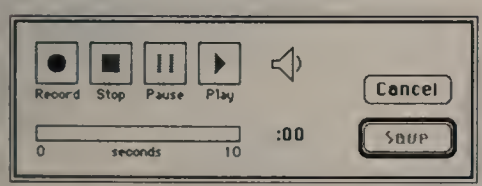
The new machines' sound circuitry supports sampling rates of 11kHz and 22kHz. The 22kHz rate provides the best sound quality, but sounds recorded at this rate use more memory and disk space. Farallon's MacRecorder, by contrast, supports sampling rates of 5kHz and 7kHz in addition to the 11kHz and 22kHz rates. Digidesign's products can sample at up to 44kHz—the rate used by compact disc players.

The Mac IIsi's button-shaped microphone

Both machines use System 6.0.6's enhanced Sound Manager to support Apple's Macintosh Audio Compression and Expansion (MACE) scheme, which allows sound to be compressed by 3:1 or 6:1 ratios. Compressed sounds require less memory and disk space, but they lack the fidelity of uncompressed ones. Still, the compression modes are useful for applications such as voice mail, where fidelity isn't critical. System 6.0.6 also includes a new version of the Control Panel device Sound, which lets you record beep sounds, eliminating the tedium of using a separate utility to paste sound resources into the System file.

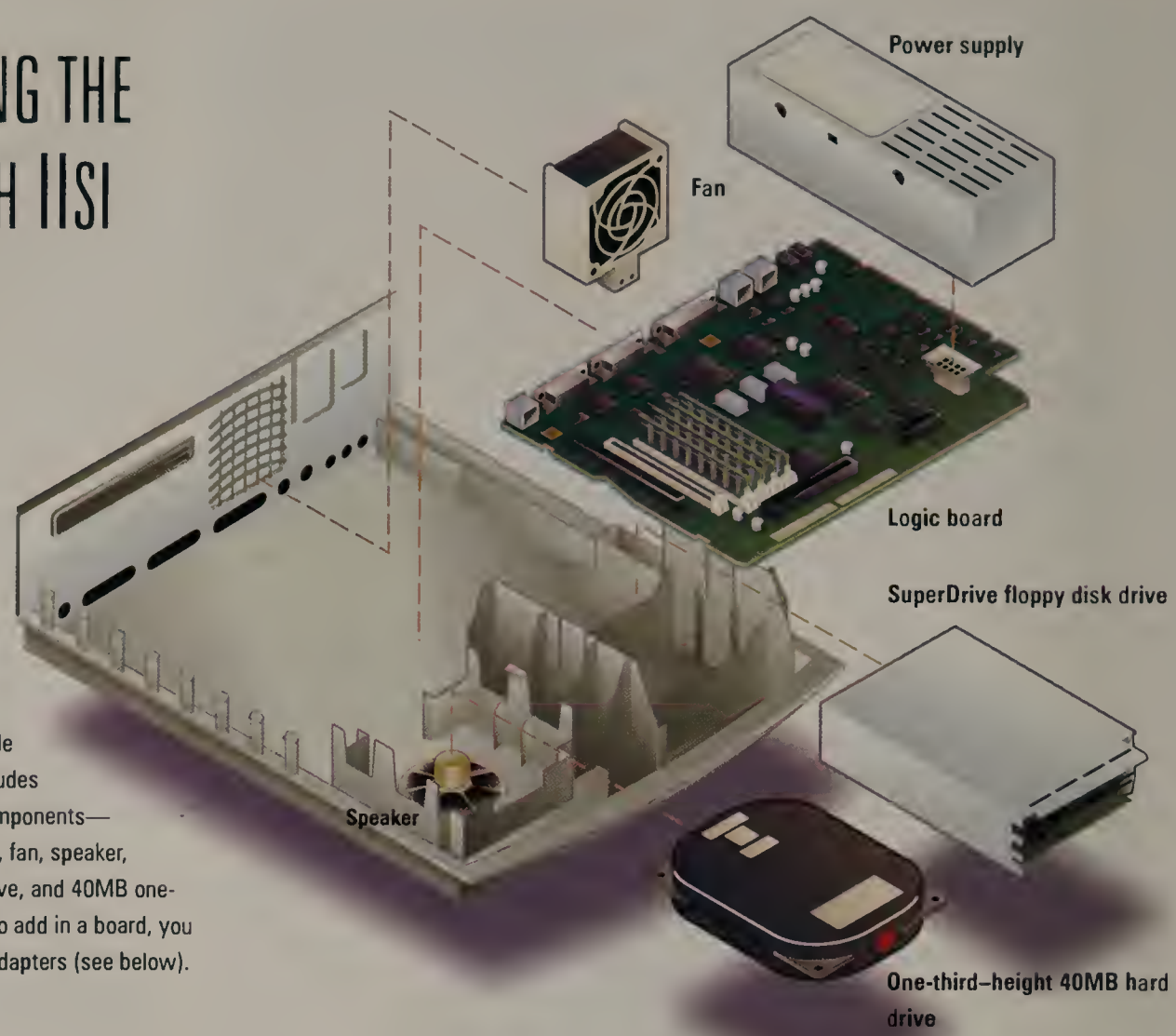
Apple has also added support for sound resources to the Clipboard, so you can cut and paste sounds between applications that support them. Apple plans to add the ability to cut and paste sounds from or to the Scrapbook. Also planned is a sound palette for HyperCard that will allow direct recording, playback, and simple sound editing.

At the briefing, Apple touted the business benefits of sound, showing a voice-mail–enhanced version of Microsoft Mail and a prerelease version of Ashton-Tate's FullWrite that supports recorded document annotations. Sound is potentially useful for E-mail, but its value for document annotation is questionable. For one thing, many people feel self-conscious about speaking into a microphone. For another, it requires more time to transmit sounds over a network than it does text, and sounds devour disk space and memory. Then there are all the Macs out there without sound-recording features. Companies that want to standardize on sound-based document annotation will need to buy a lot of MacRecorders. And finally, opening and playing back recorded annotations requires more effort than simply reading text. Sound recording is a definite strength of the new Macs, but Apple should concentrate on its value to education and presentation applications—and, let's face it, on the fun of hearing your own customized beeps.




**Now Recording** A new version of the Control Panel Device called Sound in System 6.0.6 lets you record beep sounds. Clicking on Add brings up a recording dialog box that lets you choose the recording settings and volume. Apple wants all programs that can record sound to use this dialog box.

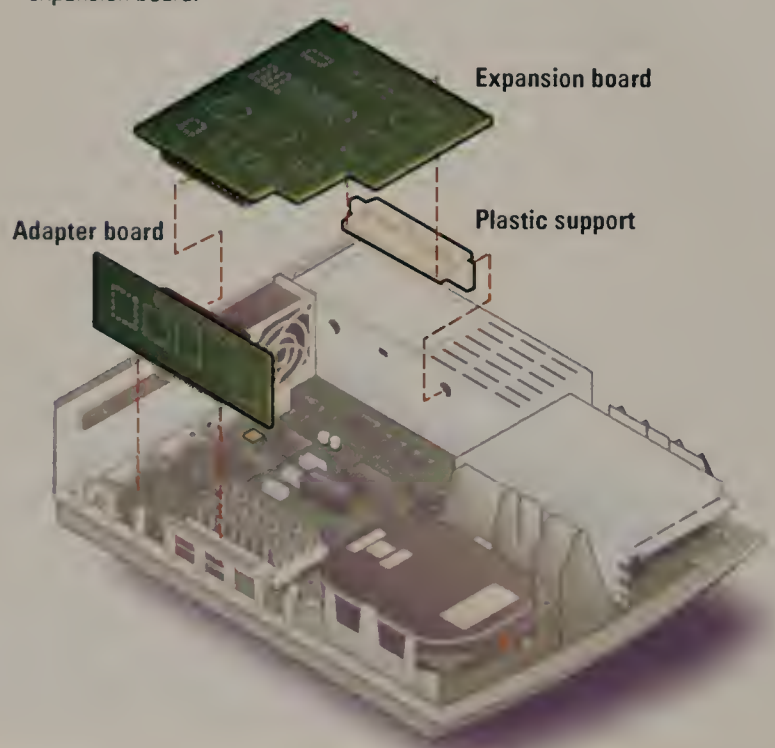
# Assembling the Macintosh IIsi




The Macintosh IIsi's simple snap-together design includes only six major internal components—logic board, power supply, fan, speaker, SuperDrive floppy disk drive, and 40MB one-third–height hard drive. To add in a board, you need one of two special adapters (see below).

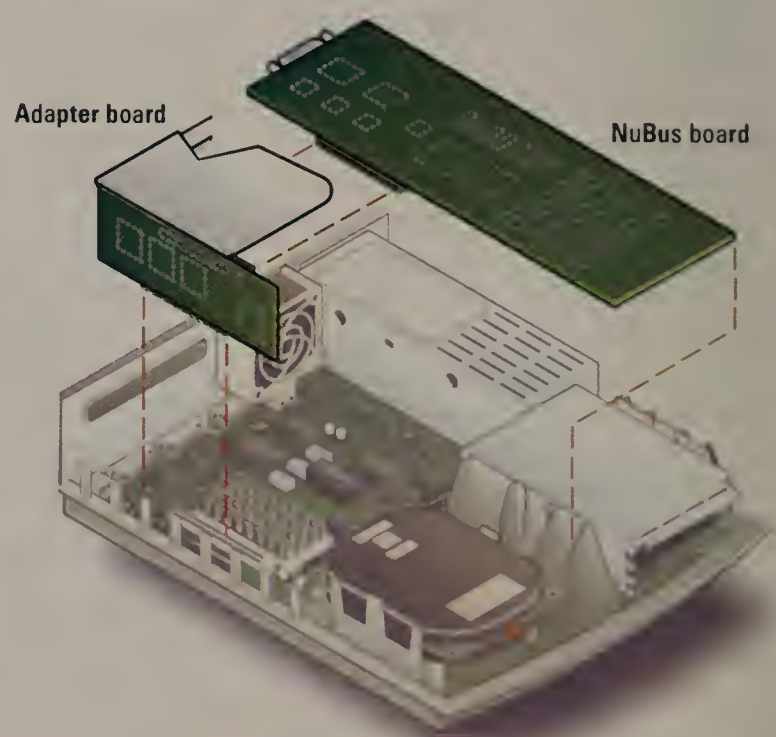
## Processor-Direct Board

To add a processor-direct board such as the SE/30 uses, you need the 030 Direct Slot Adapter Card. This $249 board includes a 68882 math coprocessor and has a slot into which you plug an 030 expansion board. The adapter is positioned at a right angle to the logic board; the 030 board runs parallel to the logic board. A plastic bracket helps support an 030 expansion board.




## NuBus Board

To add a NuBus board such as the Macintosh II family uses, you need a NuBus Slot Adapter Card. This $249 board includes a 68882 math co-processor plus Apple's custom set of NuBus transceiver chips. You plug a NuBus board into the adapter's standard 96-pin NuBus connector. The NuBus board runs parallel to the logic board. A plastic bracket inside the IIsi's case helps support the NuBus board.



faster reads from the processor's on-chip cache. This is similar to the way in which the 68030 works in a Macintosh IIci that doesn't contain a cache board.

Unlike other Mac IIs and the SE/30, however, the Macintosh IIsi does not contain a 68882 numeric coprocessor, which speeds up mathematical calculations. You can add one for $249 by buying an adapter board that plugs into the Mac IIsi's slot. For a math chip, $249 is not bad—it is considerably less than such chips cost for an IBM PC. And as you will see shortly, purchasing the adapter board is also the first step in adding an expansion board to the Macintosh IIsi.

Although the IIsi does not benefit from any of the performance-boosting coprocessing chips developed for the flagship Mac IIfx, the IIsi still has some new members in its cast of silicon characters. One of its new chips manages the ADB and contains the battery-powered real-time clock and parameter memory, while another governs the SCSI bus and the two serial ports. Apple reports that, despite the new serial chip, MIDI sequencers and other programs that expect to see and directly access the standard Serial Controller Chip should run without modification.

### The Price of Free Video

The most noteworthy custom chips in the IIsi are those that provide 8-bit video support. Like the IIci, the only other Mac II with built-in video circuitry, the IIsi employs Apple's RAM-Based Video (RBV) and Memory Decoder Unit (MDU) chips to cleverly use part of the computer's main memory to hold the bits that represent the screen image. This scheme eliminates the need for a separate video board. (You will need a separate board for 24-bit color.)

When you start up the IIsi, its video circuitry senses and adapts itself to the monitor you've attached. The circuitry supports all Apple monitors, displaying up to 256 colors or gray shades on the 13-inch color and 12-inch monochrome monitors, and up to 16 shades of gray on the Apple Portrait Display. The built-in video circuitry does not support Apple's Two-Page Monochrome Monitor, although you can use that monitor by buying a separate NuBus display adapter.

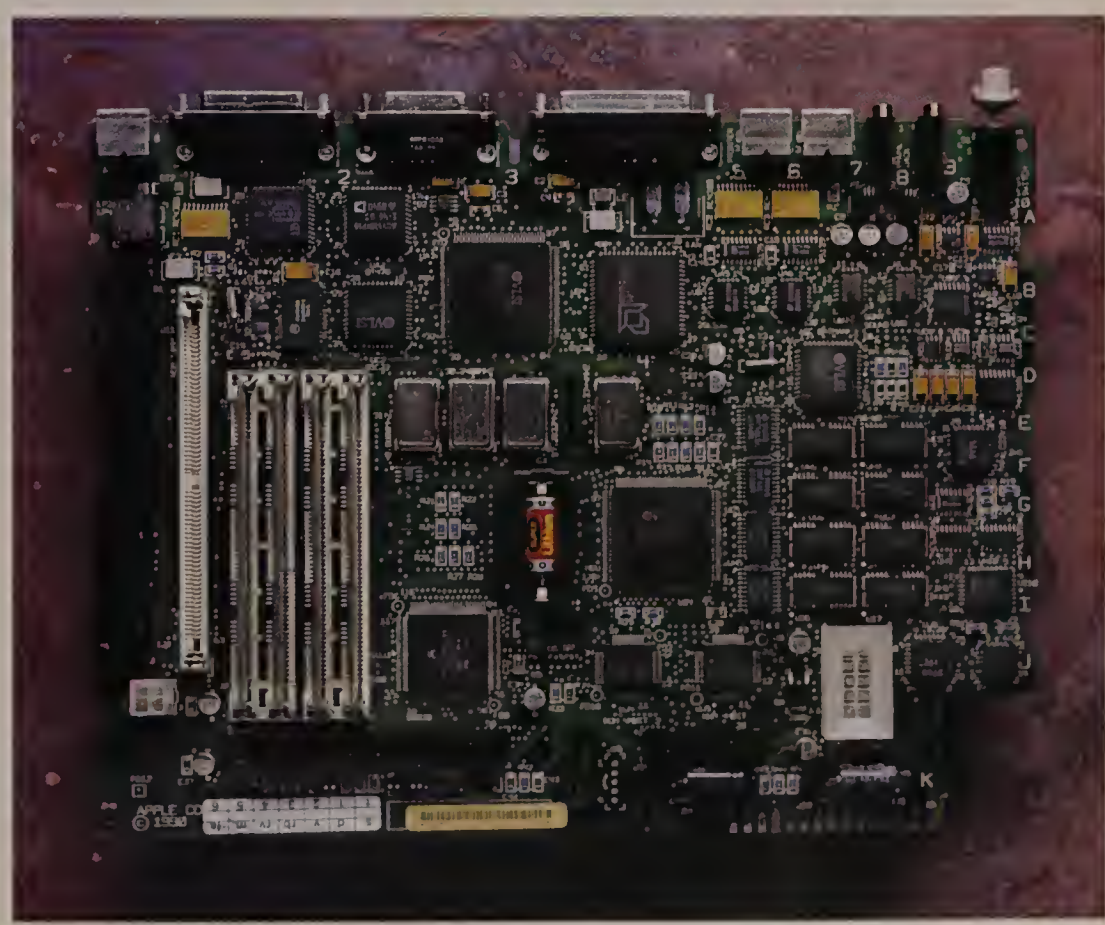
But there's a price to pay for free video. In its 16- and 256-color modes, the IIsi's on-board video runs slower than does a NuBus video board, which provides its own video memory. That's because the IIsi's 68030 often has to wait to access memory because the MDU chip is accessing the same bank of memory in the course of creating screen images. In some of Macworld Lab's tests, the IIsi using built-in video was about half as fast in 256-color mode as a IIsi using a NuBus video board (see "Display Adapters Compared").

And because the video circuitry uses part of the Macintosh IIsi's main memory to hold the screen image, less memory is available to run programs—up to 320K less in the 256-color mode. Given that 2MB of memory is the bare minimum required for Apple's forthcoming System 7.0 (and for getting any real use out of MultiFinder today), people who plan to use the Macintosh IIsi's 256-color mode extensively may want to consider upgrading to 5MB right off the bat.

### Memory Details

Fortunately, the IIsi uses standard SIMMs, so expanding its memory won't be as expensive a proposition as it is with the Mac IIfx. The machine requires 100 nanosecond (ns) RAM chips, but Apple is providing 80ns ones. Thus, users who have the IIsi and IIci can swap SIMMs between the two.

The layout of the IIsi's memory chips is unique among Macs. Memory Bank A—the 1MB bank also used for video memory—is soldered to the logic board. Joining it are four SIMM slots, which form Bank B. The 2MB version of the IIsi contains 256K SIMMs in Bank B. The 5MB configuration contains 1MB SIMMs. With



**The Macintosh IIsi Logic Board** The Macintosh IIsi's logic board has a simple and clean design. All the components are soldered on—including the 2MB of standard memory—making the board less expensive to manufacture.

**IIsi Expansion Adapters** To add a board to the Macintosh IIsi, you'll need one of two adapters. One allows the IIsi to use a NuBus board (right); the other allows the IIsi to use an 030 direct slot board.

4MB SIMMs, the logic board holds up to 17MB.

The SIMM sockets are a big improvement over those used in earlier Macs. Metal clips, not those stubborn, eminently breakable plastic ones, hold the SIMMs in place. The new clips should better withstand the process of installing and removing SIMMs and should break fewer fingernails in the process.

As for ROM, there's 512K worth in the IIsi, and the ROM chips are very similar to those in a IIci. The IIsi ROM chips contain 32-bit QuickDraw; they're 32-bit clean, and thus ready for System 7.0 (aren't we all?). The ROM chips will be soldered to the main board, but the board contains a SIMM slot designed to hold any future ROM upgrades. Apple says the ROM provided in the very first units manufactured may be SIMM-mounted.

### The Expansion Zone

As Rod Serling would say, you're about to enter another dimension. The IIsi's expansion scheme is unlike anything you've seen in the Mac world to date. At first glance, it seems awkward, even kludgey. But on closer examination, it's versatile and downright clever, able to accept either a NuBus board or a board designed for the SE/30's 030 direct slot.

Electrically, the slot on the IIsi's logic board is identical to the SE/30's 030 direct slot, and Apple says any SE/30 board that adheres to Apple's development guidelines will work. However, the IIsi's case is too short to vertically accommodate a board designed for the SE/30, where a board lies horizontally, parallel to the logic board. Enter the aforementioned $249 adapter board. Called the 030 Direct Slot Adapter Card, it contains its own slot into which you plug an 030 expansion board (see "IIsi Expansion Adapters").

Because the installed adapter board is positioned at a right angle to the logic board, the 030 board you plug in to it ends up being parallel to the logic board, and thus fits within the Macintosh IIsi's case. The 030 Direct Slot Adapter Card contains only a few parts, one being the 68882 math chip.

To install a NuBus expansion board, you buy a different adapter, called the NuBus Slot Adapter Card. This board contains a 68882 math coprocessor as well as Apple's custom-designed set of NuBus transceiver chips, which allow the IIsi to communicate with a NuBus board. And the adapter board contains the standard, 96-pin NuBus connector into which you plug a NuBus board, which runs from front to back within the IIsi's case, parallel to the logic board.

The Macintosh IIsi's ability to use either an 030 direct slot board or a NuBus board introduces an important question for Macintosh IIsi owners: which expansion camp do I buy into? Organizations with other Macintosh IIs will probably want the NuBus adapter in the interest of standardization. Also, there's currently a larger selection of NuBus boards to choose from.

But the 030 direct slot has the potential to provide higher performance for data-intensive applications like 24-bit color and digital sound processing. That's because the 030 direct slot runs at 20MHz versus the NuBus's poky 10MHz. It is also possible that more multifunction expansion boards will be developed for the 030 direct slot, now that it's supported by three Macintosh models (the SE/30, IIsi, and IIfx). In the end, Macintosh IIsi shoppers will need to do some research to determine which type of board to buy.

### Is It Worth Buying?

The verdict? The IIsi succeeds in its intended purpose—lowering the price of entry to the Macintosh II world. Its performance is excellent, and overall, it's a very appealing package.

Why consider the IIsi over the less-expensive LC? The IIsi is faster, it supports NuBus boards and a math coprocessor (albeit for an extra $249), and it supports a greater range of Apple monitors. And thanks to its 68030 (as apposed to the LC's 68020), the IIsi can run Apple's A/UX version of the UNIX operating system, and the IIsi is ready for System 7.0's virtual memory feature.

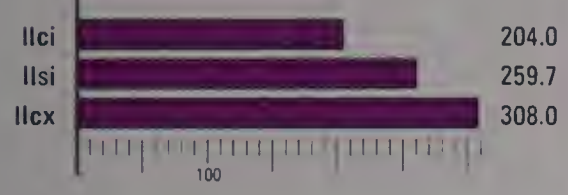
If there is a fly in the ointment, it is that single, though versatile, expansion slot. If any multifunction expansion boards become available, they will help circumvent the machine's limited expandability, but on the whole, the IIsi may not be a Mac II you can grow old with. With any computer purchase, assessing your future needs is important. With

# Ranking the Macintosh IISI

All times are in seconds

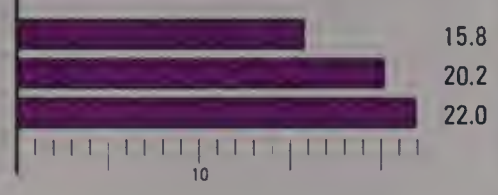
## Mathematica Recalculation

To test calculation speed, we threw a highly complex equation at Mathematica and timed how long it took the Macs to process the answer.



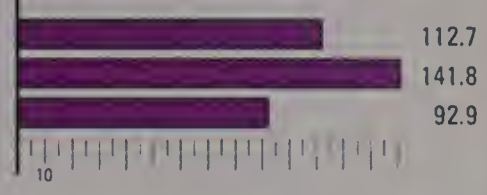

## Fit Image to Window

To test processor speed, we resized images in several graphic programs (for instance, FreeHand and ModelShop) to fit the Mac's window. (Times are averaged.)




## Change Font Style

We also timed how long it took to change a font style in a PageMaker document, including the time it took to update the screen.



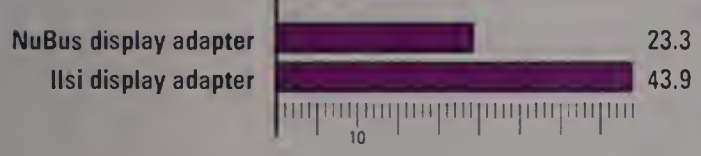

In most tests, the Macintosh IIsi came out a bit faster than the Macintosh IIcx and a bit slower than the Macintosh IIci. There were a couple of oddball exceptions, however, such as the font change in PageMaker, where the Macintosh IIsi was slower than either the Macintosh IIcx or IIci. If you pick the Macintosh IIsi over the IIci, you'll get fewer slots and, overall, slightly slower performance.

# Display Adapters Compared

All times are in seconds

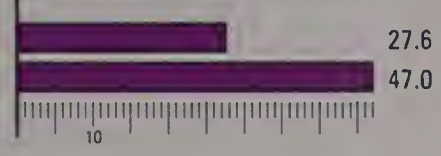
## Fit Image to Window

We resized an 831K Claris CAD image to fit perfectly in the Mac's window.



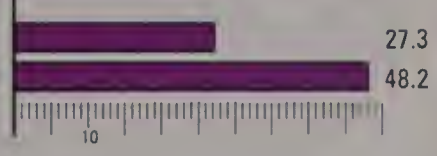

## Select All Elements

We selected all of the elements of the same complex Claris CAD image.




## Group Objects

Similarly, we grouped all of the image's objects.




A Macintosh IIsi's built-in video circuitry uses the computer's main memory; a NuBus display adapter uses its own video memory. As a result, the Macintosh IIsi using built-in video is about half the speed in 256-color mode as a Macintosh IIsi using a NuBus video board (Apple's Macintosh Display Card 4•8) in some tests. That's really a shame, since you only have one slot to fill in the Macintosh IIsi.

the Macintosh IIsi, it is paramount.

And that's why I'll miss the IIcx. Although it is slower and more expensive than the IIsi, its three slots provide more expandability, even if one is gobbled up by a video board. Many applications—including ones Apple is bent on promoting, such as multimedia—require more hardware than will fit in a IIsi.

But the truth is, most people don't need to combine real-time video, high-speed networking, and digital sound boards. They want color, and they want swift performance, and they want all the other trappings of the Macintosh II family, and they may want to upgrade to 24-bit color someday. The IIsi accommodates these needs superbly. If you're in this group—or if you have a Macintosh IIcx with more vacant slots than filled ones—the Macintosh IIsi may just be the Mac for you. ◻

See *Where to Buy* under Mac CPUs and Peripherals.

*Contributing Editor* ***Jim Heid*** *has been writing about the Mac since 1983 and has almost paid off his original Mac II, which usually contains just one expansion board. His latest book, coauthored with Peter Norton, is* Inside the Apple Macintosh, *(Brady, 1990).*

# The Santa File

*Mac gift ideas from the ultimate gift giver*

'Twas the night before Christmas, when all through the house,
The Macintosh, modem, and even the mouse
Were tidily tucked away, covered with care—
Their users knew Santa Claus soon would be there.
My Macintosh friends were all snug in their beds,
While visions of IIci's danced in their heads.

But I, with the keyboard secure in my lap,
Was dialing my modem all over the map.
A BBS here and a database there,
Well, sure, it was Christmas Eve; I didn't care.
So I dialed up one with a North Pole address—
I'd been given the number for "Claus BBS"—
When what to my wondering eyes should appear,
But a digitized sleigh and eight 3-D reindeer!

Then a spreadsheet unfurled on the screen in a trice,
Full of names and addresses, marked "naughty" or "nice."
Imagine the look of surprise on my face:
It seems I'd tapped in to Saint Nick's database!
Now, of course, there were five billion names in the list,
But to take a sneak peek . . . well, I couldn't resist.
So I did a quick search for my Macintosh friends,
To find out what the ultimate gift-giver sends.

*by David Pogue*
*[with apologies to Clement Clarke Moore]*

ILLUSTRATIONS BY JOHN CRAIG

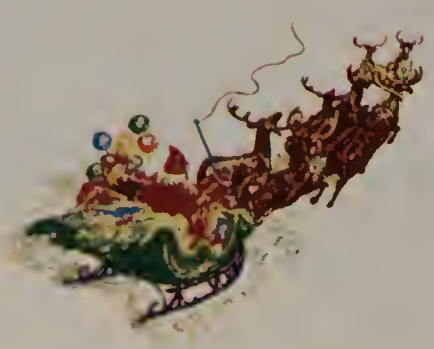
Now, Nelson, my nephew, is barely thirteen;
It's rare that a game isn't up on his screen.
**Solarian II** was the gift by his name,
A noisy and fun-to-play outer-space game.
It's for color Macs only, but boy, he'll be hooked—
Most addictive game out there, the last time I looked.
The nicest thing is that Solarian II
Is shareware: it's cheap (and no sales tax is due).

My niece, on the other hand, soon will be five,
A shoot-'em-up probably'd fry her alive.
But Santa must know what a child is about,
He's giving the charming **Inigo Gets Out,**
A HyperCard stack that has no words at all.
We follow a kitten, a cute fuzzy ball,
As he scampers and tumbles and crawls, card to card;
It's the perfect kid's present in every regard.

And what about Nathan, the neighborhood nerd?
He already owns every program, I've heard.
I did a quick search in the Santa Claus file,
And Santa thought **DisCoasters** might make him smile.
"Why, here's a diskette!" you would probably think,
But it doesn't hold data; it just holds your drink.
They're colorful, cute, and protect the veneer.
I guess Nathan has really been super this year,
For Santa had slated him, too, to receive
Some newfangled **mousepads** you wouldn't believe.
They're neon, art deco, or marbleized mats
To cushion the mice of the coolest of cats.
The Dick Tracy pad ought to give Nathan a lift,
But the Disney one, well, it's a Mickey Mouse gift.

For Wanda, my boss, there was fancier stuff,
'Cause sometimes a mousepad just isn't enough.
**LabelWriter**, it's called, and it sits on the desk.
It's triangular, small—you might say sculpturesque.
It prints self-stick labels, in your choice of font—
As handy and helpful as Wanda could want.
It gives mailing addresses an elegant touch,
But it's also for folders and boxes and such.

And if Wanda should wonder, when waxing profound,
If her data is safe when she isn't around,
She'll be happy to see nestled under the tree
The **PassProof** security kit, so that she
Will be able to seal off each drive slot and port;
She can make her Mac safe and secure as a fort.
There are plates to screw in (for the ports in the back)
And a floppy-drive key-lock that matches the Mac.
Then there's software: a screen-saver/password affair.
Type the password in right—or depart in despair.



My computer consultant, a favorite of mine,
Got *The Art of Human-Computer Interface Design.*
The title's horrendous (a little extreme)
And it ruins my poetry's rhythmical scheme.
But the book is superb, makes you think and relax,
And it's all about interface (not just the Mac's).
There are essays from Apple and from M.I.T.
They are clever and clear, au courant as can be.

And in case he wants something to read just for kicks,
He'll find plenty to do reading ***Stupid Mac Tricks.***
You guessed it: a book (and a diskette to boot)
With Talking Moose, EyeCon, and other good loot.

And while we're on books: I discovered that Miles,
My graphic designer, was there in the files.
He has only begun to do work on his Mac,
So he's getting a sweet little Mac paperback:
***The Little Mac Book.*** It's a first-timer's guide,
A short introductory book to provide
The basics of pointing and clicking and stuff,
In case the Mac manual isn't enough.

Now, a six-year-old neighbor of mine, Tiny Tom,
Has as parents some folks who enjoy CD ROM.
To find out his present, I took a quick look;
The lucky kid's getting a new **Discis Book.**
These silvery CD ROM storybooks hold
Traditional tales, all terrifically told.
You *hear* a voice read them; you follow along
The words on the screen like a "bouncing-ball" song,
As they highlight in turn while the reader goes on,
And the bright illustrations are gorgeously drawn.
There is music, and color, and pages that "turn";
It's a wonderful way for a child to learn.

LUIS DELGADO

Warm yourself in Flowfazer's glow. A Duskette keeps disk drives snug while the fin betrays a Protector Shark's presence.

If you leave your Mac on while you go get caffeine,
And it sits there all day, it might burn in your screen.
So to Macintosh people whose screens are at risk,
Santa's bringing a screen-saver program on disk.
The **Protector Shark** screen saver tends to produce
A carnivorous shark when your Mac's not in use.
It swims back and forth on your screen hunting meat,
Pursuing a diver it's trying to eat.
But it's also a game; when ol' Sharkey appears,
The lone diver is you; press a key to shoot spears!
(When you're working too late, and you're starting to crack,
Put the real rubber fin up on top of your Mac.)

If variety sounds like it's more thrilling still,
Maybe **Pyro** or **After Dark 2** fills the bill.
They both come with folders of modules to use;
Try fireworks, lightning, whatever you choose,
Or a message, a clock, or some shimmering art.

Fill your not-in-use screen with the pix in your heart.
(Both programs have blossomed by leaps and by bounds;
The new After Dark even has digitized sounds!)

But save strangest for last, that's what I always say,
And Todd Rundgren's **Flowfazer**'s the weirdest today.
It's a bit Californian, you might say New Age,
For its soothing displays make your mind disengage;
At times it's a liquidy lava-lamp glow,
At others, a spiraling, shimmering show.
All the screen savers work on all Macintosh screens,
But, of course, they're more striking on color machines.

I went searching for Ed, the ad agency guy;
He's a musical MIDI-head, with a supply
Of cables and keyboards hooked up to his Mac,
He's forever unplugging his modem-port jack.
So into his sack this year Santa Claus flings
An **ABCD Box** to simplify things.
Into each of its ports (there are four in a row)
A modem or interface cable can go.
Then the whole thing plugs in to the Mac, and it's nice:
Ed just punches a button to choose a device.

I have quite a few friends in New York, where the dust
Tends to gather so fast that it leaves 'em nonplussed.
So for people with disk drives exposed to such air,
A **Duskette** ought to make sterling stocking-stuff fare.
It's a black rubber cover that fits in the slot,
Keeping dust out, and insects—whatever you've got.

I'm sure Uncle Irv wants another hard disk
To hold all his memos and mailings and misc.
But hard disks cost money, and also they weigh
Enough to substantially slow Santa's sleigh.
So instead he'll be getting some more storage space
In the form of **DiskDoubler**, a disk-saving grace.
It works in the Finder, and here's the surprise:
It shrinks any file to a much smaller size.
And then later, when you need the process reversed,
Must you Quit from your program, expand the file first?
Why, no; use the regular Open command,
Select the right file, and then watch it expand.

"Sit 28 inches away from your screen,"
Said somebody smart to my neighbor Noreen.
(There's concern in the press that a color display
Can emit radiation to that far away.)
So she's getting (by air freight—those eight antlered steeds),
An **extra-long keyboard cord**—just what she needs.
She can type up to six feet away from her Mac,
Now if only her kids cut her half as much slack!

The gift for my mom is an idyllic fit:
**America Online**—a (free) starter kit.

LUIS DELGADO

What's nerd for Noel? From left to right: the ABCD Box, two DisCoasters, parts of the PassProof security kit, a LabelWriter Printer, books, a marblerized mousepad, and the Nada Chair

A page from the Discis Books version of Beatrix Potter's *The Tale of Benjamin Bunny*. Click on the speakers, and a voice reads text; point to a word, and the voice will pronounce and define it. On request, the program can also pronounce and spell any part of the illustration.

It's a service, known sometimes as simply AO,
That you call with your modem—a great place to go.
It's got icons and menus—familiar terrain;
(It's a wee bit addictive, but who can complain?)
There are movie reviews, stock and weather reports,
And there's live conversation, a chat line of sorts.
There's a Macworld Online (what will they think of next?)
With a searchable index of back-issue text.

For Dad, on the other hand, Santa had found
The gift for the guy who likes sitting around.
In fact, since he sits for eight hours a day,
The small of Dad's back sometimes starts to give way.
So under the tree, what will Father find there?
Not a disk, not a drive, but instead, **Nada Chair.**
It's hard to explain, but not hard to put on;
For many who wear it the back pain is gone.
Let's see now . . . the padded part goes on your back;
You tighten the knee straps to take up the slack.
The upshot: your knees are supporting your spine,
A comfy and (so they say) healthy design.

What a glorious evening, surveying that list—
Why, I didn't believe such a file could exist!
And from millions of options, Saint Nicholas plucks
A majority costing below 50 bucks.
When I checked my clock radio, midnight had passed,
And I knew that I'd best get some shut-eye at last,
But before I logged off, there was one final thing . . .
To reveal one more item that Santa would bring . . .
After buddies, and bosses, and distant in-laws,
I decided to see what he'll give Mrs. Claus.

When I saw what it was, I broke out in a grin,
For it wasn't expensive, it didn't plug in.
He'd found just the gift that would light up her Mac:
Her very own custom-made HyperCard stack.
Any person could do it, it hadn't been hard;
But his love and affection were there on each card,
No, he wasn't an artist, but back in his shop
He'd drawn elves at the edges, and toys at the top.
To move through the stack, you could click on a star.
I sat and I marveled, entranced from afar
For the text was a poem he'd written his dear,
Mrs. Claus will receive nothing nicer this year.

And the final card says, before fading from sight,
"Happy Holidays, all, and to all a good night!"

***See* Where to Buy *under "Santa's Spec Sheet," on page 367, for information about products in this article.***

***David Pogue*** *is a* Macworld *contributing ed. And he wishes our readers a great year ahead.*

# Networking for the Novice

**Creating and designing an AppleTalk network isn't difficult to do. Just remember these basic rules.**

by Brita Meng

There they were, fresh out of their cartons—Will's new Macintosh IIci and LaserWriter IINT. "Excellent," thought Will, "my fledgling guitar-design firm now has the potential to be truly successful and astonishing." In no time, Will had a CAD program up and running, and he began sketching out a flame-red double-cutaway solid-body with an offset waist. A few hours later, marveling at his handiwork, Will decided that a crisp laser print of his new design was in order. But how to hook up the LaserWriter? ▫ "Heinous!" Will said aloud. "I only now realize that I know nothing about connecting computers and peripherals to achieve my artistic yet profit-oriented goals!" ▫ Scowling at the nest of cables and connectors at his feet, Will suddenly jumped back. Pixel by pixel, an apparition began taking form. Bearded and wise, the figure addressed Will in a mystical tone of voice: "Ah, my young friend, perhaps I can be of assistance. Let me show you how to set up a network that will allow your ideas to reach fruition." ▫ Will, taken aback, snapped, "Who are you? And why should I care about computer networks—all I want is a printout of my new guitar?" ▫ "Allow me to answer those questions in series," the figure replied. "I am Dwayne, and I come from the future. Your cry has been heard. You are not alone in your disinterest in the esoterica of networking, but you must understand that connecting a LaserWriter to a Macintosh

5
2#5=7
2 3 #8 7 = 6

requires the creation of an AppleTalk network."

"That stuff is for serious geeks," exclaimed Will. "I'm just a designer trying to make a buck."

"Nonsense," replied Dwayne. "Anyone can set up a useful AppleTalk network without much trouble. You just have to know your options, plan wisely, and keep in mind some basic networking rules.

"By following these rules," Dwayne intoned, "you'll be able to expand your network easily, and soon you'll be doing much more than just printing out a sketch of your guitar. You can share files and peripherals other than laser printers, exchange electronic mail, and run multiuser applications. Such capabilities will become important—even necessary—as your company grows." Dwayne raised one eyebrow. "You do expect your company to be successful, don't you?"

Will nodded enthusiastically. "Well then," responded Dwayne, "the most important thing to remember is that any network really consists of only two things: hardware and software. Besides computers and printers—networking types call them nodes—other hardware items include the cabling and any connectors necessary to connect the nodes together. Then, each node must run software that follows a predefined set of rules, or a *protocol*, to communicate with other nodes. In your case, the protocol is AppleTalk."

"If I understand your most impressive language correctly," Will said hesitantly, "I can see that I already have the two nodes I need. But I apparently forgot to buy the software."

"Perhaps not," Dwayne said with a smile. "First, let's look at ways you can connect your two nodes."

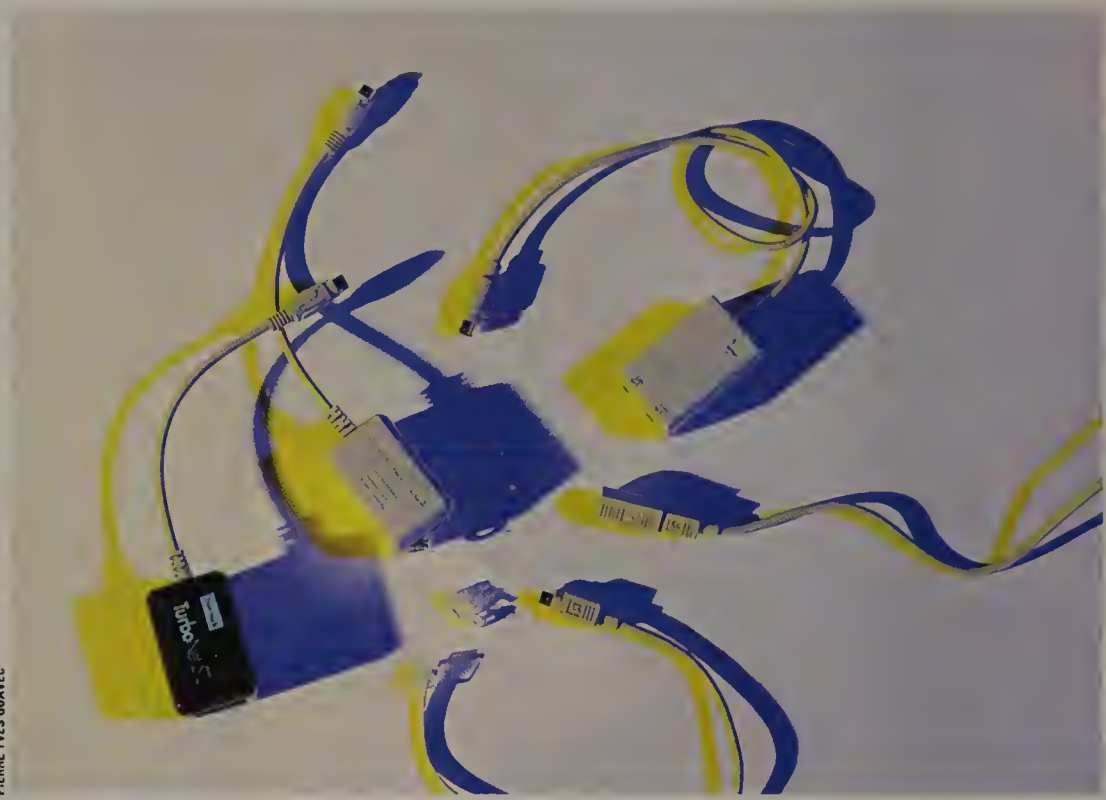
### Daisy-Chain Solutions

He reached into his jacket, pulled out a piece of paper, and examined it. "The first steps in creating a network include determining how fast the network needs to move data, deciding its layout, or *topology*, and finally, choosing the cabling to use."

"For your purposes, I think LocalTalk transmission speeds of 230.4 kilobits per second will be more than adequate. Because your Mac and LaserWriter are less than 1000 feet apart, I recommend a simple *daisy-chain* topology with LocalTalk-compatible cabling."

Will was taken aback. "Why does the distance between my nodes matter?" he asked.

"An excellent question," answered Dwayne. "Different types of cabling have varying electrical characteristics—resistance, in particular. When signals travel over wire, the resistance of the wire causes a certain amount of *signal loss* per foot of cable. The higher the gauge of the wire, the



PIERRE YVES GOAVEC

Three options for AppleTalk network connectors: (clockwise from left) Nuvotech's self-terminating TurboNet ST; Farallon Computing's PhoneNet Connector, which requires the resistor below it for termination; and Apple's self-terminating LocalTalk.

## CONNECTORS AND CABLES

| Company | Product | DIN-8 | DB-9 | DB-25 | Cable |
|---|---|---|---|---|---|
| AESP | CompuTalk | $75 | $75 | | |
| Apple Computer | LocalTalk Connector Kit DIN 8 | $75 | $75 | | |
| | 10-meter extension | | | | $75 |
| | 25-meter extension | | | | $125 |
| Belkin Components | BelTalk | $69 | $69 | | |
| Belkin Components | QuikNet | $49 | $54 | | |
| Data Spec | ModuNet | $39.95 | $43.95 | $47.95 | |
| Data Spec | ModuNet EZ | $44.95 | $49.95 | | |
| Farallon Computing | PhoneNet Connector | $59.95 | $59.95 | $75 | |
| Farallon Computing | PhoneNet StarConnector | $29.95 | $29.95 | | |
| | 500-foot twisted-pair cable | | | | $100 |
| | 14-foot RJ-11 extension | | | | $5 |
| | 25-foot RJ-11 extension | | | | $7 |
| | 25-foot RJ-45 extension | | | | $12 |
| | PhoneNet-to-LocalTalk cable | | | | $9.95 |
| Infotek | QuickNet | $49 | $45 | | |
| Laser Connection | Q-Talk | $59 | $59 | | |
| Nuvotech | TurboNet | $49.95 | $49.95 | | |
| Nuvotech | TurboNet ST | $59.95 | $59.95 | | |
| Sitka | Teleconnector | $39.95 | $39.95 | | |
| Trimar USA | CompuNet | $29.95 | $29.95 | | |

shorter the distance a signal can travel effectively."

"So when I'm picking cables, all I have to worry about is how far apart the nodes are," concluded Will.

"Not quite," said Dwayne. "When you create an AppleTalk network in a daisy-chain layout, every node must have its own connector box. The number of connector boxes—and thus the number of nodes—on a network also influences how far a signal can go. That's because every connector box has its own resistance. As a result, a daisy-chain topology—even though it's the easiest to set up—offers the shortest maximum network length. It also restricts the number of nodes possible on the network."

"What exactly are the limits on daisy chains?" Will asked.

"Well, LocalTalk connector kits from Apple can handle up to 32 nodes on a network that spans 1000 feet. LocalTalk-compatible connectors that use telephone wire—like Farallon's PhoneNet Connector or Nuvotech's TurboNet ST—can handle up to 24 nodes on an 1800-foot network," answered Dwayne, reaching into his satchel. "I happen to have two connector kits right here—one of them ought to do the trick."

Dwayne squinted at the first connector and sadly shook his head. "Both your Mac and LaserWriter require network connectors with DIN-8 plugs. This connector has a DB-9 plug. I'm afraid it won't do. I keep that connector around just in case a network includes an older Mac or older LaserWriter." Dwayne reached into his pocket again and pulled out another connector. "This one will work," he said, plugging in the cables and connector boxes.

"Now," announced Dwayne, "for the AppleTalk software you think you forgot." He turned on Will's Mac and, with a wizardlike flip of the mouse, selected the Chooser desk accessory. "You see, the AppleTalk software you need comes with the Mac and the LaserWriter. For the Mac to send and receive AppleTalk signals, all you have to do is turn on AppleTalk. Then, the Mac can see your LaserWriter on the network."

With a cry of thanks, Will immediately printed his design. As Dwayne turned to leave, Will looked up. "At the risk of revealing my dweebdom,"

## DAISY-CHAIN TOPOLOGY

In a daisy-chain configuration, each network node **(A)** has a network connector **(B)**, and cable **(C)** is strung between each of the nodes. There isn't one long cable. Instead, the cable from one node is attached to a connector, which has another cable attached to another node's connector, and so on. You can use LocalTalk, PhoneNet, or any other LocalTalk-compatible connectors and cable to create a daisy-chain network.

## SHARING PERIPHERALS

| Vendor | Product | Price | Other |
|---|---|---|---|
| Apple Computer | ImageWriter II/LQ LocalTalk Option | $139 | LocalTalk Interface for ImageWriter II |
| Hayes Microcomputer Products | HayesConnect | $79 | software allows Hayes modem to be shared over network |
| Hayes Microcomputer Products | Smartmodem 2400M | $499 | internal Mac II modem that can be shared over the network |
| Shiva Corporation | DOS Connect | $99 | PC Access to NetModem and NetSerial |
| Shiva Corporation | DOS Dial-In | $99 | (for 3 users), requires NetModem or TeleBridge |
| Shiva Corporation | NetModem V.32 | $1999 | allows sharing of 9600-bps modem, remote dial-in to network |
| Shiva Corporation | NetModem V2400 | $599 | allows sharing of 2400-baud modem, remote dial-in to network |
| Shiva Corporation | NetSerial | $399 | allows 1 RS-232 device to be shared over network |
| Solana Electronics | C-Server | $695 | allows 3 RS-232 devices to be shared over network |
| Xecom | Newport Data Modems | $329–$349 | internal modems for SE, SE/30, II, and Portable that can be shared over the network |
| Xecom | Newport Fax/Data Modems | $599–$899 | internal fax and data modems for SE, SE/30, II, and Portable that can be shared over the network |
| Xecom | QuadPort II Fax | $2399 | four fax modems on one Mac II board that can be shared over the network |
| Xecom | QuadPort II 2400MNP5 | $1799 | four 2400-baud modems on one Mac II board that can be shared over the network |
| Xecom | QuadPort II Fax/Data | $2999 | four fax and data modems on one Mac II board that can be shared over the network |

## BRIDGES AND GATEWAYS

| Vendor | Product | Local Router | Remote Router | Ethernet Router | Token-Ring Router | Other | Price |
|---|---|---|---|---|---|---|---|
| Andrew KMW Systems | NetAxcess | ○ | ○ | ○ | ○ | connects to AS/400 or System/3 | $3995 |
| Apple Computer | AppleTalk Internet Router | ○ | ○ | ● | ● | | $399 |
| APT Communications | ComTalk | ● | ○ | ● | ● | also offers shared serial ports | $3250–$12,000 |
| Avatar Corporation | MacMainFrame Token Ring Gateway | ○ | ○ | ○ | ● | | $2495–$4495 |
| Avatar Corporation | MacMainFrame SDLC Gateway | ○ | ○ | ○ | ○ | remote access to IBM mainframe | $2495–$4495 |
| Cactus Computer | BroadTalk to LocalTalk Gateway | ○ | ○ | ○ | | gateway to broad-band LAN | $2985 |
| Cayman Systems | GatorBox | ○ | ○ | ● | ○ | | $2995 |
| Compatible Systems Corporation | Ether Route | ○ | ○ | ○ | ○ | | $1495 |
| Digital Communications Association | MacIrmaLan 802.2 Gateway Server | ○ | ○ | ○ | ● | | $3995–$5995 |
| Digital Communications Association | MacIrmaLan SDLC Gateway2 Server | ○ | ○ | ○ | ○ | remote access to IBM mainframe | $4495–$6495 |
| Engage Communication | SyncRouter | ○ | ○ | ○ | ○ | bridges AppleTalk LANs over T1, fiber-optic, Digital Data Service, satellite links | $1895 |
| Farallon Computing | PhoneNet Liaison | ● | ● | ● | ○ | | $395 |
| Hayes Microcomputer Products | InterBridge | ● | ● | ○ | ○ | | $799 |
| Network Resources Corporation | MultiGate 2000 | ○ | ○ | ● | ○ | also offers gateways to broad-band and fiber-optic LANs | $1195–$2395 |
| Northern Telecom | LANstar AppleTalk Bridge | ○ | ○ | ○ | ○ | offers gateway to LANstar networks | $200 |
| Nuvotech | TurboBridge | ● | ○ | ○ | ○ | | $499 |
| P-Ingenierie | InterTalk #2 | ● | ○ | ○ | ○ | | $650 |
| Shiva Corporation | EtherGate | ○ | ○ | ● | ○ | also offers shared serial port | $2399 |
| Shiva Corporation | FastPath | ○ | ○ | ● | ○ | | $2795 |
| Shiva Corporation | NetBridge | ● | ○ | ○ | ○ | | $499 |
| Shiva Corporation | TeleBridge | ○ | ● | ○ | ○ | also supports remote dial-in to network | $499 |
| Solana Electronics | H-Server | ○ | ● | ○ | ○ | also supports synchronous transmissions | $695 |
| Solana Electronics | I-Server | ● | ○ | ○ | ○ | | $695 |
| Solana Electronics | R-Server | ● | ● | ○ | ○ | | $595 |
| Tri-Data Systems | Netway 1000 | ○ | ○ | ○ | ○ | connects to IBM host | $4995–$14,495 |
| Tri-Data Systems | Netway 2000 | ○ | ○ | ○ | ○ | connects to IBM host, supports Novell IPX | $4995–$13,995 |
| Tri-Data Systems | MaxWay 500 | ● | ● | ● | ● | also supports Novell IPX | $5495 |
| The Wollongong Group | MacGateWay AT | ○ | ○ | ● | ○ | | $2295 |

● = *yes*; ○ = *no*

he said, "I have yet another question. If I bring my talented friend Ned into my humble operation, can I make him a node too?"

"Oh yes," Dwayne replied. "Just buy another identical connector kit and hook Ned's computer to either your LaserWriter or your Mac. In fact, you can add as many nodes as that cabling allows in similar fashion. But whatever you do, make sure your daisy-chain cabling doesn't form a closed loop. A loop causes signal reflections on the cable and that would be," Dwayne smiled, "heinous."

### Time Passes

Reappearing a few months later, Dwayne was visibly surprised to find ten guitar designers jammed into the tiny space. When he saw Dwayne appear, Will jumped up and maneuvered his way through the crowded room.

"How timely of you to drop by," he cried. "We are about to move our gushing business to the top floor of an imposing office building downtown, and I am badly in need of more network information."

Dwayne reassured Will that the present chaos could be brought under control. "In fact," he said, "there are three ways to solve your network quandary.

"The first solution involves putting a *repeater* on your daisy-chain network. Remember that resistance causes network signals to deteriorate,

## PICKING THE RIGHT CONNECTOR

Because different devices use different plugs, you may need to buy several versions of a LocalTalk-compatible connector box to create a LocalTalk network. Here's a head start to matching the right connector plug to the device.

**DIN-8**
Macintosh Classic, LC, Plus, Portable, SE, SE/30, II, IIcx, IIci, IIfx, IIsi, Apple IIGS, Apple IIe*, ImageWriter II*, ImageWriter LQ*, LaserWriter IINT, LaserWriter IINTX

**DB-9**
Macintosh 128K, 512K, 512KE LaserWriter, LaserWriter Plus IBM PC, XT, AT, and compatibles*

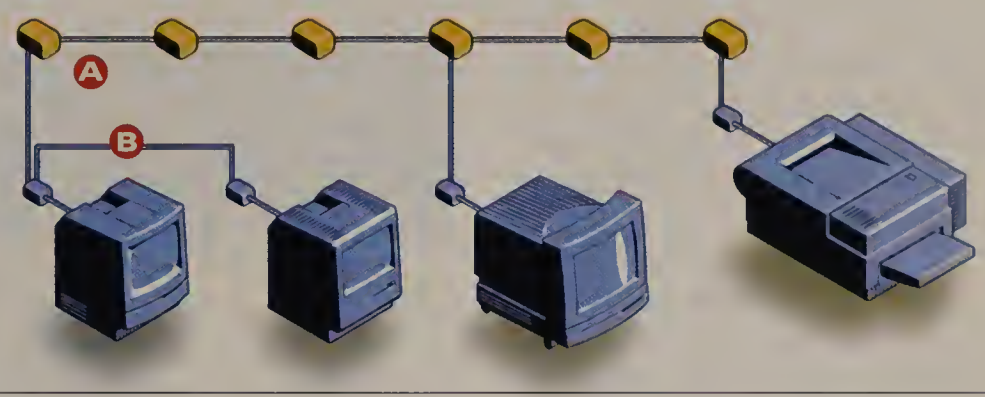
**DB-25**
Macintosh XL (Lisa)

**With AppleTalk add-in board.*

# BACKBONE TOPOLOGY

In a backbone (sometimes called a trunk) configuration, one solid length of cable extends across the entire network. Network nodes connect to that cable via drops **(A)** or connection points scattered along the cable. Once a node is attached to the backbone, you can connect other devices to the node in a daisy-chain configuration **(B)**. Connectors like PhoneNet or TurboNet let you connect nodes to a backbone of telephone wire using RJ-11 telephone modular wall jacks as drops.

Another popular medium for backbones is Ethernet coaxial cable. Because Ethernet has a 10-Mbit/sec data rate, information can travel faster over it than over typical twisted-pair telephone wire, making Ethernet more appropriate for high-traffic networks. Recently, vendors have started offering twisted-pair Ethernet, a medium that combines the speed of Ethernet with the flexibility of telephone wire. To run at Ethernet speeds over twisted-pair wire, there need to be two pairs of cable. To get to LocalTalk speeds (230.4 Kbits/sec) requires only one pair.




limiting the length of the daisy-chain and the number of nodes on the network. A repeater lets you get around those restrictions by amplifying an AppleTalk signal so it can travel through several more thousand feet of cable and support more nodes."

"Say no more," exclaimed Will. "I am certain that anything involving an amplifier is the answer for me."

"Perhaps," said Dwayne. "But it can be most awkward to run cable around doors, over ceilings, and down hallways just to maintain a daisy-chain connection between nodes. And with a daisy-chain topology, if any daisy-chain link gets disconnected, the whole network fails."

"Just like old Christmas-tree lights," observed Will. "That indeed is a problem. Our new space has several doors and hallways."

### Backbone Approach

Dwayne nodded. "The second alternative abandons the daisy-chain topology for another, called the *backbone*. In a backbone-style network, up to 48 nodes connect to one long length of twisted-pair telephone cable, instead of directly with other nodes.

"Again, the gauge of the backbone wire affects the total length of the network," he continued. "A network can run up to 4500 feet if you use 22-gauge telephone wire as the backbone. You can have up to a 3000-foot network with 24-gauge wire, while 26-gauge wire only permits an 1800-foot network."

"I can see how the backbone eliminates the Christmas-tree-light syndrome because I no longer need to worry about broken network connections," Will said hesitantly. "But won't it still be most awkward to lay one long cable through the doors and walls?"

### Star Appeal

"A perceptive comment indeed," Dwayne complimented Will. "The backbone topology works best if your office is one large space. Since yours isn't, the most convenient way to connect your network will be with a third topology, called a *star*. This last option offers network reliability along with cabling convenience."

"Most excellent!" Will exclaimed. "But how do I lay out the cable?"

"That's the beauty of the star," Dwayne said with a smile. "You can use the telephone cabling that already exists in your office space. You see, most installed telephone systems use 4-wire twisted-pair cable. But the telephone itself really needs only 2 wires—one pair of that cabling. As a result, you can use the unused pair of wires as cabling for the AppleTalk network. If your AppleTalk connector boxes have RJ-11 twisted-pair jacks, that is."

"Speaking as a newly cost-conscious executive, I must say the star sounds ideal. I don't have to run any cable to offices because all my offices already have phones," mused Will.

Dwayne nodded. "To create the network, all you do is connect those pairs of wires at a *punchdown block* in the telephone closet. That lets

AppleTalk signals from one office node travel to the closet on their own pair of wires, then to the rest of the network from the closet, or *hub*."

Will rubbed his hands together with glee. "This seems too easy. The bountiful star will let me expand the network no matter how big my office space!"

### Branching Out

"Easy there, cowboy," Dwayne cautioned. "There are some limitations to the star topology—namely the number of *branches* that extend from your hub and the length of each branch."

"Don't tell me," Will moaned. "Wire resistance again."

"Yes," Dwayne said. "Because of the way the star is laid out, AppleTalk signals can degrade quickly. And if the signal degrades too much, it becomes unrecognizable at nodes along the other branches, making your network extremely unreliable."

"To avoid this dreaded situation, you need a *multiport repeater* or *star controller*. These devices, which connect to the punchdown block in the telephone closet, amplify AppleTalk signals between network branches.

"Multiport repeaters," Dwayne continued, "increase cabling lengths for each branch and improve network reliability. This type of network is called an *active star* network, because the star controller actively generates clean signals along each branch."

"Do I have to install a multiport repeater to use the star topology?" asked Will.

"Not necessarily. Without a star controller or multiport repeater, your configuration would be called a *passive star* network," Dwayne responded. "The problem is that a passive star network is less expandable; it can never have more than four branches. If there are four branches, each branch can have only 12 nodes on it. If you use 22-gauge telephone wire, each branch can extend 1125 feet; 24-gauge wire allows 750-foot branches, 26-gauge wire, 450 feet.

"If there are three branches, on the other hand, up to 16 nodes can attach to each branch. In that case, with 22-gauge telephone wire, a branch can extend 1500 feet; using 24-gauge wire, a branch can measure 1000 feet; and with 26-gauge wire, up to 600 feet."

Will nodded. "Those are indeed considerable limitations," he agreed.

"With an active star network," Dwayne continued, "the restrictions are fewer. Depending on which multiport repeater you buy, you can have up to 12 ports, each of which can support 4 separate branches. And each port can handle branches up to 3000 feet in length."

"Then the active star sounds like my network solution," concluded Will. "With such a network in our new office, our guitar designs will soon be all the rage."

### Routing Directions

Will's prediction of success soon came true. His guitars appeared regularly in music videos and on concert stages all around the world. Dwayne dropped by to check in on his protégé. A good thing, too, because Will was in dire straits.

"Like a cold beverage on a hot day, you again come to my rescue," Will exclaimed when he saw Dwayne. "By expanding to another floor in this fine building, I fear we have brought our network to a most horrible grinding halt.

"I now have two active star networks—one for each floor," he went on. "But it is terribly inconvenient being unable to print on the downstairs laser printer when I happen to

## OTHER NETWORK PRODUCTS

| Product | Vendor | Description | Price |
|---|---|---|---|
| **Repeaters, Concentrators, and Hubs** | | | |
| AESP | CompuTalk Plus | 3 ports; 4 ports; 5 ports | $179; $209; $249 |
| Cactus Computer | StarBurst | 8 ports | $2046 |
| Farallon Computing | PhoneNet Repeater | reclocks and retransmits signals | $495 |
| Farallon Computing | PhoneNet StarController 300 | 12 ports | $1295 |
| Nuvotech | TurboStar | 12 ports | $1795 |
| Photonics Corporation | PhotoLink | 4-node infrared AppleTalk transmitter | $1195 |
| Sitka | Repeater | retransmits signals | $189 |
| **LocalTalk Accelerators** | | | |
| Dayna Communications | DaynaTalk | boosts rates up to 850 kbps | $139 |
| Dayna Communications | SpeedGuard Collision Filter* | prevents packet collisions on DaynaTalk | $69.95 |
| Sitka | Flashbox DIN-8 | boosts rates up to 770 kbps | $189 |
| Sitka | Flashbox DB-9 | boosts rates up to 770 kbps | $189 |
| **LocalTalk Access for Other Computers** | | | |
| Apple Computer | Apple II Workstation Card | LocalTalk interface for Apple II | $249 |
| Apple Computer | LocalTalk PC Card | for AT bus PCs | $299 |
| Dayna Communications | DaynaTalk MC Card | for MicroChannel PCs | $399 |
| Dayna Communications | DaynaTalk PC Card | for AT bus PCs | $299 |
| DayStar Digital | LT200 Connection MC | for MicroChannel PCs | $395 |
| DayStar Digital | LT200 Connection PC | for AT bus PCs | $249 |
| EMAC | SpeedTalk | for AT bus PCs | $149 |
| Hercules Computer Technology | Hercules Network Card Plus | combo video board/ LocalTalk board | $369 |
| Information Presentation Technologies | IPT230/A AppleTalk Interface Card | multiport LocalTalk interface for UNIX systems | $495 |
| Sitka | FlashCard | for AT bus PCs | $239 |

* *For use with DaynaTalk.*

be upstairs, and then not being able to use the upstairs file server when I'm downstairs."

Glancing at several ragged holes drilled into the ceiling, Dwayne murmured that he understood. "Your problem is very easily solved, Will," he said. "What you need is a way to connect the upstairs network with the downstairs network."

"How?" Will asked, aiming a paper airplane at one of the holes in the ceiling.

"With a *router*," Dwayne answered, dodging the wayward airplane. "A router lets you create an *internetwork*—internet, for short—out of your two separate AppleTalk networks. The network on one side can communicate with the other, but only when it needs to. At the same time, the router keeps network performance from slowing down. Only data that needs to flow from one network to another gets transferred across the router.

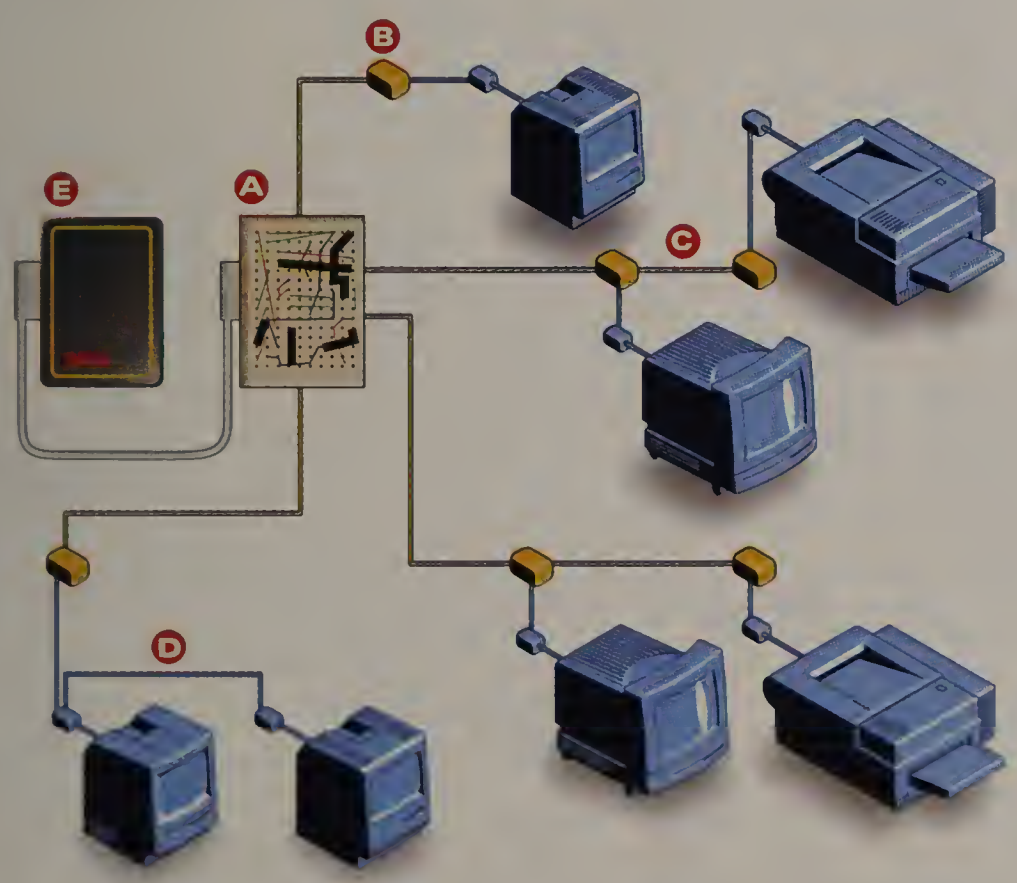
"Because your two networks are close together, it will simply be a matter of connecting one port of each star controller to a *local router*. But if you ever open a branch office, you can use a *remote router* to make the branch's network part of the internet too.

"If network traffic becomes too heavy, causing network response to become sluggish, you'll need a *gateway*. Gateways let you connect the internet with a backbone cable—Ethernet, for example—that provides faster transmission rates than LocalTalk. The layout of such an internet is exactly like a backbone, except that entire networks can attach to the backbone, not just individual nodes."

## Star Topology

In a star topology, many network branches connect at a central location, usually a punchdown block **(A)** located in a telephone wiring closet. The network can be easily reconfigured from that central location, making the star the most flexible topology for a network. A node connects to a branch at an RJ-11 telephone modular wall jack **(B)**, which acts as a drop point. There can be multiple drops **(C)** along the length of a branch. Once one node is attached to a branch, other devices can be daisy-chained to that node **(D)**. Because twisted-pair telephone cabling is the basis for star wiring, you should use twisted-pair connector boxes—like PhoneNet and TurboNet—to attach nodes to the network.

There are two different types of star configurations: active and passive. An active star network, like the one shown below, has a multiport repeater **(E)** connected at the hub. The multiport repeater takes signals from a branch and repeats them at full strength along all the other branches. A passive star network has no multiport repeater; the lack of a multiport repeater considerably limits the number of nodes and branches on the star, as well as the length of each branch.




### Zoning Rules

"I fear that I must be becoming a network geek," mused Will, "because another question occurs to me. Won't this be terribly confusing to the network novices on my staff—having access to two or three networks instead of one?"

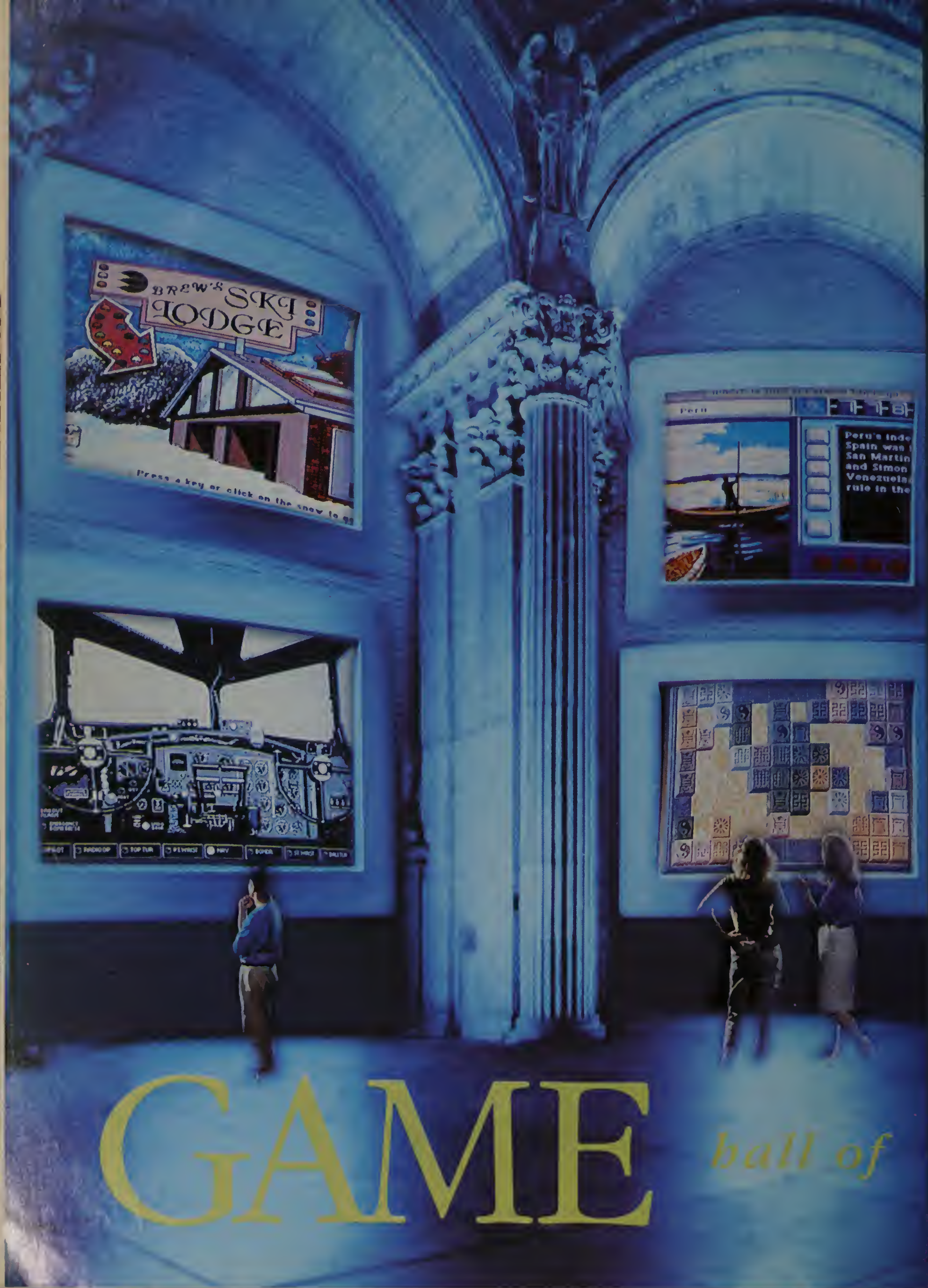
"Well, once you have an internet, you can divide it into *zones* so it looks less complex to users. Zones are a logical way to group networks on an internet.

"For example, Will," Dwayne continued, "you could name your zones Upstairs and Downstairs. When you open the Chooser, you see the names of the zones. Select Upstairs and LaserWriter, and only the printers upstairs appear in the list of possible printers. That way, everyone knows exactly where they're printing to. The same goes for other devices on the network—file servers, modems, and so on."

Will was most impressed. "Never would I have thought that computer networks would be such a big part of my humble plan to design electric guitars. I owe you one, oh mighty Dwayne from the future. How can I repay you for your most triumphant guidance?"

Dwayne just smiled. "Don't worry about it, Will. You already have." With that, Dwayne mysteriously vanished, leaving behind on Will's desk only a holographic business card: Dwayne's Vintage Guitars. ◻

See *Where to Buy* for contact information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# GAME *hall of*

# FAME

## Steven Levy Erects a Digital Hall for Games

Perhaps we should have asked the architect of the beautiful new Macintosh Game Hall of Fame facility to make the building look like the Alamo instead of a giant IIcx. Because lately we've been feeling rather besieged. The Game Hall of Fame is, after all, the Last Stand for dedicated Macintosh gamers, who have suffered yet another year of fewer choices than have their brothers and sisters using IBM, Amiga, and even the ancient Commodore 64 computers. (Some have thrown in the towel and purchased Nintendo.) We still believe that the Mac is a great gaming computer—each year we find dazzling evidence of this—but while game quality improves, the numbers look worse and worse. Is the cavalry in sight? We don't exactly hear hoofbeats. On

BY STEVEN LEVY

the other hand, optimists like to think that Apple's new econo-Macs (discussed elsewhere in this issue) will tempt more publishers to develop games for our favorite computer.

But that's not the worst of it. We've also had to cope with a perfectly dreadful trend in copy protection: the Surprise Quiz. Remember when you showed up for class and, first thing, Mrs. Finchbutter told you to tear off a sheet of tablet paper and answer some questions about Mesopotamia or whatever the homework was the previous night? Same thing happens when you play a game these days. We didn't like it in the seventh grade, and we hate it now. Even though you paid for the software, and presumably should be able to play it without harassment, all too often you can't play the game before answering a question like "What is the 9th word on the 17th line on page 50 in the manual?" You are then required to locate the (unpaginated) manual, count out the proper number of pages and lines and words, and then provide the answer. If you make a typing mistake, a siren rings and the screen blinks COPYRIGHT CRIMINAL! in red letters, and the disk ejects itself across the room. Or else you have to match a picture with a word on one of those little wheels, only the picture on the screen doesn't exactly match the pictures on the wheel, which really doesn't matter since the wheel is buried somewhere on your desk, or someone threw it out by mistake and you have to order another one for $15.

Most galling of all is that software publishers think they're doing you a favor by using this "off-disk" form of copy protection! Well, the Game Hall of Fame is now on record: Don't do us those favors. If you want to fight pirates, join the navy—don't punish paying customers. We didn't dock games this year for inflicting upon us those odious Surprise Quizzes, but in the future we will look verry darkly upon those offenders who, by presenting unpleasant obstacles to using their wares, make their games less playable.

**Sky Shadow (Casady & Greene)** Early in a Sky Shadow game—a game that could eat up eight straight hours—you put your ship down for a landing to get repaired and resupplied with bombs. Then it's off to shoot more Razoropers!

Are we sounding testy on what is, after all, a mountaintop experience for our new inductees? Sorry. With all that unpleasantness aside, we can turn to more agreeable matters. There were a number of great games considered for induction into the Hall this year. In fact, so compelling were some of the candidates that our deadline kept slipping as our Gaming Kahuna—the gentleman identified in the above byline—felt it necessary to consider some games for hours on end, and some for several days. Sometimes requiring him to skip meals, or to greet the dawn from the wrong end, or even—he is embarrassed at this—to ignore a charming though excessively vocal infant, whose antics are almost as amusing as the plumber's in Pipe Dream.

The Macintosh Game Hall of Fame, while the ultimate test of excellence in Mac entertainment software, is a subjective effort by the aforementioned Kahuna. He does consult with a nominating panel that suggests games for consideration and perceptively discusses the relative merits of the candidates. Unlike its baseball counterpart, the Mac Game Hall of Fame does not consider moral character as a criterion; rather, we value innovation, playability, depth, addictiveness, malleability, mental challenge, amount of adrenaline produced, and ideally, the ability to take the lessons learned from playing the game into the wider world.

Without further ado, here is the class of '90.

**Best Simulation Game: Bomber**

A great simulation provides more than an entertaining escape: it evokes an entire world. (Often the real-life alternatives to these worlds aren't nearly as pleasant and low-risk as the Mac versions.) Stacked at the top of our list this year is Bomber, a fascinating HyperCard re-creation of air warfare in the European theater of World War II. Using simple yet historically accurate controlling devices, you take on several roles: as pilot you fly the craft and run the mission; as navigator you may change course; as gunner you shoot at marauding fighters; and as bombardier you control the run and drop the eggs. The annoying drone of an airplane accompanies you throughout, and for some reason small earphones are included to enhance this noise. Complete 25 missions and you get to go home. (We haven't done it yet, mainly because we're afraid that, à la *Catch 22,* our commanding officer would immediately increase the number.) Alternating periods of relative calm (flying to your destination) with white-knuckled terror (hitting heavy flak, or facing enemy fighters when you've been separated from your fleet), Bomber does an excellent job of resurrecting any number of lousy B movies. Joseph Heller fans note: Here are the Snowdens of yesteryear.

**Best Sports Game: MacSki**

To read the promotional materials hyping this game you'd think it was a grim-faced and technical skiing simulation, one of those dry and overly detailed games that swapped laughs for verisimilitude. (It even comes with a warning that you shouldn't use MacSki in place of a "real" ski instructor.) Actually, the game is a hoot. As you shooosh downhill (with great digitized sound effects, particularly at sharp turns), you must avoid a cartoony collection of amusing obstacles, including hopping jackrabbits, medics bearing fallen competitors, and sexy snow bunnies. Besides your being graded on standard stuff like speed and slalom gates, certain runs are scored on less traditional criteria. Like passing through tiny Stonehenge arches, or busting through snowmen, or—animal lovers, take cover—how many penguins you can mow down. Some real skill is required, especially for the more difficult runs, but even beach bums can pick up the basics rather quickly—MacSki uses the mouse quite effectively to move your skier. And if you're feeling creative, you have the option of designing your own ski runs. The only complaint is that when you've wiped out five times during a run (and believe us, this will happen to you on some of those steep slopes), an amusing-at-first-but-very-quickly-gets-old Saint Bernard rescues you. It takes forever, and you can't speed it up. (For a review of MacSki, see *Reviews* in this issue.)

**Best Arcade Game: Pipe Dream**

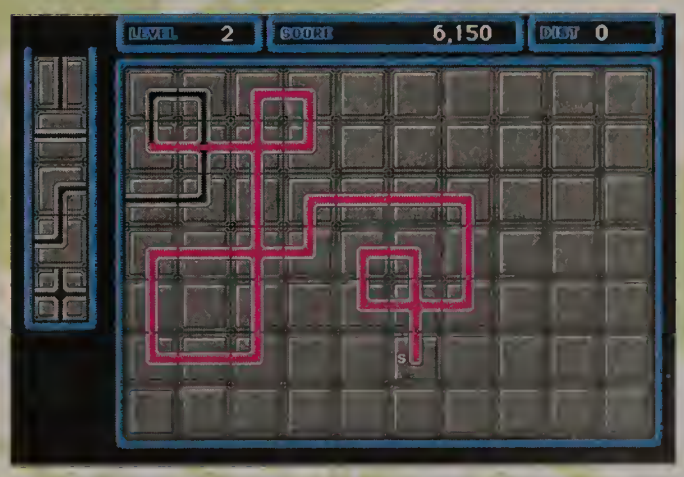
You like arcade-style games and want something grittier than those insipid Mario brothers? Now there's Pipe Dream, the game that pits you against a constant flow of pink sewage called flooze. (Don't even think of what made it pink.) Even if you previously hadn't considered plumbing a glamour profession, you'll find Pipe Dream irresistible, not only because of the delightful carnival-like soundtrack and the bright graphics, but also because underneath it all is a seriously addictive strategy game. Once you get into Pipe Dream in a big way, you won't be hearing the music—you'll be too busy figuring out the complex series of twists and turns you use to connect pipe. And with 36 levels of play, the challenge far exceeds the ability of even the most precocious preteen. Sorry, kids: Pipe Dream might amuse you, but it's really for adults. An added bonus is a stripped-down version you install as a desk accessory. When you find it on someone's system, you know that person's logged too many hours stemming flooze flow.

**Best Shoot-'em-up: Sky Shadow**

Patrick Buckland, who created Game Hall of Fame winner Crystal Quest, doesn't quite recreate the thrill of his brilliantly original first ef-

**Bomber (InLine Design)** At 17,000 feet your B-17 is flying in formation with other bombers on their way to Amiens to take out a fighter airfield. You have control not only of the instruments in the cockpit but also of those in the bomb bay and even in the fighter turrets.

**MacSki (XOR Corporation)** An intrepid skier successfully negotiates the slalom flags and avoids squirrels, medics, snowmen, and various other debris. Had he been really sharp, though, he would have run over that little clock and picked up some time.




**PipeDream (Lucasfilm Games; distributed by Electronic Arts)** A Pipe Dream game on Level 2. There are some nifty twists and turns, and enough points here to get to the trickier Level 3. But at this point there's nowhere to go—note the impending dead end.

fort, but this equally addictive shoot-'em-up will probably cause more carpal tunnel syndrome this year than a truckload of word processors could. Sky Shadow owes an obvious debt to the early eighties arcade game Defender: you control a laser-equipped bomber that flies over a scrolling landscape. But certain twists make Sky Shadow distinctive. One is that there are prisoner-of-war camps in the terrain; hit one and you hear a pained digitized groan that means you have lost all your points for that round. Another is that you must snare goodies hanging in the air that give you point bonuses; smart bombs (that clear the screen of foes); instant repairs; temporary invulnerability; and the ability to land, recharge your ship, and get more bombs. But the key to this game is racking up enough points on a given ship to shift into MegaMode. It's like hitting all the bumpers on a pinball machine. Your speed doubles, you get more points for everything you hit, and everything happens so quickly that it seems only a superbeing can control events. Yet eventually you persist. *Eventually* in this case may encompass hundreds of hours, none of which have any socially redeeming value. In short, the essence of a good shoot-'em-up. (For a review of Sky Shadow, see *Reviews,* in this issue.)

**Best Brain Teaser: Ishido: The Way of Stones**

Soothing digitized wind chimes immediately inform you that Ishido is one classy operation. The publishers have it that this is the computer version of an ancient oriental game of great renown, sort of a cross between go and mah-jongg. The credits thank several Zen roshis, an expert on ancient runes, and Timothy Leary. But when you cut through all the hexagrams, advice from the computer oracle, and other trappings of the mystical East, you have the most compelling mental challenge since, well, go and mah-jongg. The elements of game play are fairly simple: you have a virtual pouch of stones with various colors and symbols, and by matching them to other stones on a gridded game board, you try to empty your pouch. The Zen version of a home run comes when you get what is called a *four-way*—dropping a stone in to match stones on all four sides. It isn't as easy as it sounds. Designer Michael J. Feinberg has provided an entrancing atmosphere that enhances game play; particularly charming are the textures of the stones rendered on a color Mac. And budding runeologists can design their own stone sets.

**Ishido (Accolade)** That twinkle in the center of the board signifies that the player has completed a *four-way,* placing a stone in a space surrounded by four other stones, two of which match by color, and two by symbol. Sound tough? You betcha.

**Best Role-Playing Game: Legends of the Lost Realm**

For years now, the Game Hall of Fame has been looking for the role-playing epic that tops Wizardry. Here it is. Legends of the Lost Realm eschews the flash of some other recent dragon-and-dungeon efforts in favor of familiar types of conflicts done as well as can be imagined. While originality is not its strong suit—we're talking standard-issue D&D—Legends is sufficiently playable so that even a novice gamer would have no trouble forming a party and setting off in search of hidden treasures and gory violence. Motion in the perilous world of Tagor-Dal (why do these faux-medieval realms always have such dumb names?) is controlled by mouse movement. Likewise, a mouse-click or two will inform you on the status of your characters. Your handy pointing device controls even the complicated skirmishes between your party and the various Amazons, stooges, and wild dogs you encounter in your quest to find the magic staff that will save this particular world.

If you're at all inclined to the gestalt of mazes, the lure of spell-casting and enchanted weapons, the habit of making corpses undead, and the peculiar charm of descending into darkness, lock yourself in a room with Legends of the Lost Realm and don't forget to pack a lunch.

**Best Adventure Game: Where in Time Is Carmen Sandiego?**

With the fourth chapter in the Carmen Sandiego saga, the mysterious leader of an international (and time-traveling) cabal of imaginative thieves finally makes the Hall—we momentarily expect to hear that the plaque to Dark Castle is missing. Because apparently the Sandiego gang, also known as V.I.L.E., will take anything, including Enrico Caruso's tonsils and the original Santa Claus. Your job, as a fledgling detective in the Acme Agency, is to use the enclosed Chromo-skimmer 325i to engage in time travel, interview witnesses and informers, identify the perpetrator, and nail the crook. Instead of a Crimestopper's Notebook, you have an up-to-date American Desk Encyclopedia that yields putatively educa-

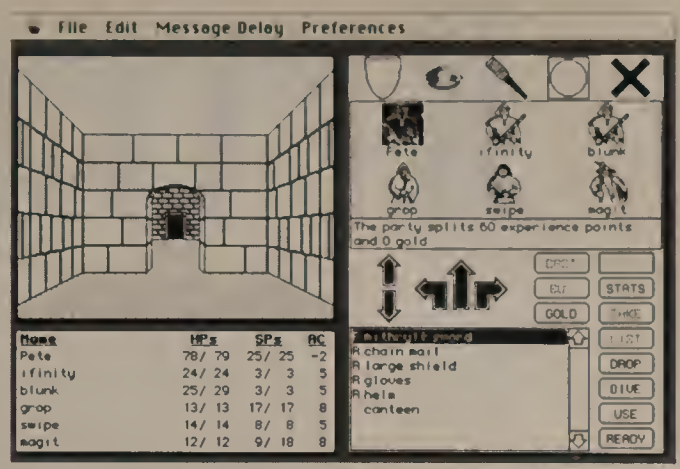
tional factoids to help interpret clues. Sophisticated adventure gamers might sniff at the relative ease with which the crooks fall into line, but everybody else will get a kick out of chasing Carmen's minions. Graphics and game play are top-notch—and besides, how else would you find out historical trivia like who the Capetians are and the inventor of corrective lenses? Best of all, unlike other adventure epics that require a few months' labor before a payoff, this is broken into discrete cases that take only a few minutes each. And by the time you've solved the 80 cases required to become the top detective, you'll have ingested enough useless facts to become a "Jeopardy" contestant.

### Best Strategy Game: Stratego

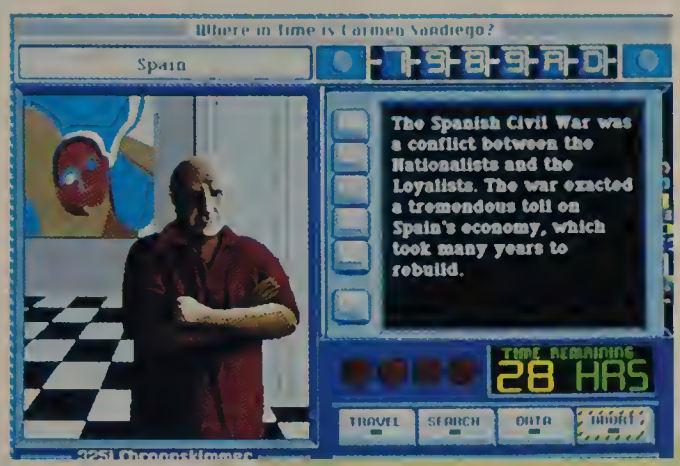
All too often when a classic board game is translated to the computer the consumer eagerly spends several times the cost of the original (which invariably evokes fond memories of grimy fingers moving game pieces) and almost instantly comes down with a case of Is-That-All-There-Is?, as the realization dawns that it made more sense to leave well enough alone. Isn't that right, Monopoly fans? Scrabble nuts? Not so here. From the first alarum of the Napoleonic troops it's clear that rather than diminishing the board-game experience, Stratego intensifies it. This is a solitaire game (head-to-head players have to stick with the Milton Bradley hardware version), with the Macintosh providing the competition. But the rules are the same: you set up and manipulate game pieces to capture your opponent's flag before he or she (or the Mac) gets yours. Arranging the board with the selection of officers, soldiers, miners, and bombs is easy, especially since you can save your favorite initial setups or choose from a collection of devastating arrangements. And it's easy to try variations on the game, shifting from regulation play to the trickier Tournament Rules. The sound effects are amusing but not so obtrusive that you feel like turning them off after two or three rounds. Best of all are the slick graphics: the rendition of the Bradley version is impressive enough, but tinkerers will enjoy customizing the battlefield and game pieces. The Game Hall of Fame admits that this choice was the toughest of all—wonderful, original strategy games like Panzer Battle, Blockout, and Faces stylishly burned up a lot of hours for us—but the elegant simplicity of this translation makes Mac Stratego an evergreen, a welcome addition to the Hall. ■

See *Where to Buy* for contact information.

***Steven Levy**, a* Macworld *columnist, is currently at work on a book on artificial life.*




**Legends of the Lost Realm (Avalon Hill)** After a nasty scuffle with four packs of wild dogs, a novice party of magicians, fighters, thieves, and shamans split the experience points and prepare to venture into the heart of darkness.




**Where in Time Is Carmen Sandiego? (Brøderbund Software)** With 28 hours investigation time remaining in the Chromoskimmer 325i, your detective work has led you to Spain during the civil war. (Note the grim look on Picasso's face.) You learn a factoid about the period and continue looking for a time bandit in Carmen Sandiego's nefarious crew.

**Stratego (Accolade)** The Stratego battlefield in midwar. The bottom half of the board is the human's side. Note the placement of the spy, strategically situated to ensnare the computer team's marshal when he unsuspectingly moves into the adjoining vacant space.

# REVIEWS

Erasable Magneto-Optical Disc Drive

## LASERSAFE

**Pros:** Attention to amenities and engineering; custom cache and driver; vendor stability. **Cons:** Slow internal Ricoh mechanism.
**Company:** Iomega. **Requires:** Mac SE; hard drive; System 6.0.3.
**List price:** $4999, cartridge $299.

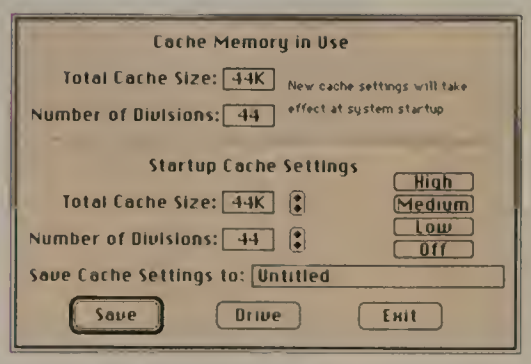
MARK JOHANN

Iomega's LaserSafe

In the March 1990 issue, *Macworld* looked at 16 erasable optical disc systems that were priced similarly and that incorporated drive mechanisms from one of two sources (Sony or Ricoh). Some, however, were nearly twice as fast as others. Although this market is crowded, it's possible to make a drive stand out by providing extra software utilities, hardware enhancements, or hard work on low-level matters affecting speed. Iomega, distinguished by its unique Bernoulli drive systems, has now entered the erasable optical market with the Iomega LaserSafe, a product that offers enhancements in all three of these areas.

### Niceties

The LaserSafe offers nearly all the key features called for in erasable opticals. The drive has a back-panel, button-settable SCSI address indicator, and SCSI termination switch (off/on); these seem like small considerations, unless they're absent and you have to set DIP switches in awkward spots on a circuit board. The software provides other practical amenities. First, Iomega provides software for formatting erasable optical discs as a background task under MultiFinder. Since formatting one side of a disc takes about 40 minutes on a Mac II, this utility is obviously helpful to users who accumulate piles of graphics and database discs. Iomega's partitioning software supports up to ten disc partitions per side. Also, the company includes a version of Iomega Workshop, a set of functions that simplify using an erasable optical to back up a standard hard drive. The LaserSafe takes either 512-bytes-per-sector or 1024-bytes-per-sector erasable optical cartridges—the 1024-bytes-per-sector discs give somewhat faster performance, but the 512s let you make the LaserSafe the start-up disc.




**Credit for the Cache** You can fine-tune cache settings for particular styles of use from this dialog box in the Iomega Workshop utility. The settings provided by Iomega are optimized for general use (transferring files that are a variety of lengths).

### Fast Times, Fast Drive?

Could you, in fact, use the LaserSafe as a start-up drive in place of a standard hard drive and be happy with the arrangement? Despite Iomega's impressive efforts to squeeze every kilobyte-per-second of performance out of the slower Ricoh drive (Ricoh's disc-rotation speed is 1800 rpm versus Sony's 2400), you probably won't want to use this drive or any other erasable optical as your main storage unit. In benchmarks for the real world—launching application files, backing up a 40-megabyte hard drive—the LaserSafe would average third place with the 16 optical drives tested in March, behind the drives from La Cie and Pinnacle, but ahead of any Ricoh-based drive and most of the Sonys.

The benchmarks based on SCSI

read-write speed quoted in Iomega's advertising, which show the LaserSafe as dramatically faster than either competing Sony or Ricoh drives, are in fact actual numbers—for a particular size of block transfer optimally matched to the LaserSafe's built-in hardware cache. In testing, Iomega used an SE/30 as the Macintosh host, the 3.3 version driver software, blind data transfer, large blocks, and no verification. If you make copies of megabyte-size graphics files, you'll see most of this speed; if you're backing up lots of small files like letters to Mom, some of the speed benefits of the LaserSafe arrangement disappear.

Iomega wrote an optimized driver in assembler rather than a higher-level language, and included a hardware cache, which can be configured by the user with Iomega Workshop, to compensate for the mechanism's leisurely rotational speed (see "Credit for the Cache"). If you know you'll always be dealing with large data blocks (a typical case), or if you have small or medium blocks of constant size (less typical), you can vary the cache settings to squeak out 10 to 20 percent optimization over the Iomega preset values. It's not the answer to every data-transfer problem, but it can be effective, and it certainly puts Iomega in an enviable market position if Ricoh ever begins delivering a high-rpm drive subsystem.

### Spin Control

The LaserSafe is worth considering as an erasable optical for several reasons. First, it includes well-selected and useful software (although a disc organizer and a password security utility would be welcome additions). Second, the hardware cache and driver put the LaserSafe near the top of the speed class for erasable opticals. Finally, Iomega as a firm is likely to last longer than the drive's warranty—unlike many smaller prospectors in the erasable-optical gold rush, Iomega has lots of successful products to help fund the customer support lines while the erasable optical market evolves. The LaserSafe offers a respectable value for the price, and it's a solid piece of vendor engineering.—**Charles Seiter**

***See Where to Buy or circle 759 on reader service card.***

★

**Ten Children's Books on CD ROM**

## DISCIS BOOKS

**Pros:** Good reproduction of illustrations and texts; entertaining and educational; requires no keyboard skills. **Cons:** None. **Company:** Discis Knowledge Research. **Requires:** Mac Plus; CD ROM player. **List price:** Complete library (10 volumes) $750; stories also available individually (see "Discis Books").

Discis Any parent, uncle, or grandma who's had the pleasure and frustration of spending time with children knows how difficult it can be to instill in them an appreciation for the written word. Of course the earlier you hook kids on reading, the quicker you tap their creativity, thirst for knowledge, and writing skills. As Jean Brodie put it, "Give me a girl at an impressionable age and she is mine for life." There aren't many teachers like Miss Jean Brodie around these days; alas, the American landscape at the end of this century isn't very friendly to teachers in or out of their prime. Reading and the great pleasure it brings seems to have gone out of fashion too. According to the United States Department of Education, our overcrowded schools, antiquated educational system, underfunded classrooms, and underpaid teachers graduate an estimated 2.2 million new illiterate young people every year. Add these to the more than 26 million adults in this country who cannot read, write, or handle numbers well enough to meet the literacy demands of today's society, and you begin to think our illiteracy problem is unsolvable. New methods of teaching and learning will certainly help, and these "books" are a move in the right direction.

MARK JOHANN

Discis books are fun, educational, look good in black and white (and sensational in color), don't need a hard drive to run, and don't require the user to have computer skills. Five-year-olds can master them easily and quickly . . . which, of course, is the idea. Loading and starting a Discis Book CD ROM is a snap. Turn on the CD ROM drive, then turn on the Mac. Place the CD in the caddy and insert the caddy into the drive. A window opens on the Mac showing two icons, one with the title of the book and another that reads Discis Books. Double-click on either icon and the book opens up to the title page. It gets even easier. All you do is click on a word, picture, page corner, or the speaker icon at the head of each sentence to make things happen. Double-click on something, almost anything, and after the word for what you're pointing to is spoken, each syllable is pronounced slowly and clearly. Not sure what to do? A talking question mark guides you through all the possibilities.

### Is It Polite to Point and Click?

One of the drawings in *Moving Gives Me a Stomach Ache* shows a little boy standing by an open packing box holding his stomach. Point and click on anything in the picture and a voice describes it while the word or words for it appear on screen until you select another object or move the cursor to the lower-right-hand corner and turn the page to continue the story.

Point and click on a nearby dresser and the voice announces "bureau." Point to the ceramic figure on it and click and the voice says "piggy bank." When I clicked on a lower wall, the voice instructed me with "baseboard." This one picture

*(continues)*

## DISCIS BOOKS

| Title | Author | Illustrator/ Artist | Suggested Price | Suggested Age |
|---|---|---|---|---|
| A Long Hard Day on the Ranch | Audrey Nelson | | $84.95 | 6 + |
| Cinderella, the Original Fairy Tale | | | $69.95 | 6 + |
| Heather Hits her First Home Run | Ted Plantos | Heather Collins | $84.95 | 6 + |
| Moving Gives Me a Stomach Ache | Heather McKend | Heather Collins | $84.95 | 6 + |
| Mud Puddle | Robert N. Munsch | Sami Suomalainen | $74.95 | 6 + |
| The Paper Bag Princess | Robert N. Munsch | | $69.95 | 6 + |
| Scary Poems for Rotten Kids | sean o huigin | | $84.95 | 8 + |
| The Tale of Benjamin Bunny | Beatrix Potter | | $69.95 | 5 + |
| The Tale of Peter Rabbit | Beatrix Potter | | $69.95 | 5 + |
| Thomas' Snowsuit | Robert N. Munsch | Michael Martchenko | $74.95 | 5 + |

contains over 30 objects that can be spoken, pronounced, and written.

**Reading, Writing, and Monster Munch**

The volumes can be customized in several ways. You can keep and recall lists of words, you can slow the reader's voice or speed it up, and change font styles and sizes. There is even an electronic bookmark that returns you to where you left off in your last session.

A hard copy of the book is not included with the CD ROM disc, but each disc includes a user's guide and a valuable teacher's guide. The 12-page teacher's guide to *Scary Poems for Rotten Kids* includes a short essay entitled "Poetry in a Literature-Based Classroom," a line or two about each of the 15 poems on the disk, instructions on how to set up the classroom to maximize computer use, and an activity sheet with suggestions for things the reader/listener can do away from the book and the computer screen. Here's a sample:

**READING**

- Read other children's poets—Dennis Lee, Shel Silverstein, and Michael Rosen.

**WRITING**

- Create a "Things I'm Scared of" list.
- Write your own scary poems to publish and share with your friends.

**COOKING**

- Make Spooky Sundaes and Monster Munch. [The recipes are included.]

**MUSIC**

- Using shakers, lummi sticks, dried-out gourds, and other home-made instruments, make musical sound effects to accompany the poems . . .

**SCIENCE**

- Children are fascinated by spiders, worms, and snakes. Use the library to find out more about them.

The background music for each Discis Book (foreground if you opt to read instead of listening to the reader) is melodic. It never intrudes on the action. A Latin beat introduces *Heather Hits her First Home Run* and gives way to the proper musical tension when the heroine comes up to bat. In *The Paper Bag Princess*, when Prince Ronald, still clutching his tennis racket, is carried off by a fierce fire-breathing dragon, the up, up, and away music lends excitement to the moment.

Ken Jones, who is responsible for all the musical cues and sound effects for the series, uses the clippity-clop of coconut shells and a sampled harmonica and acoustic guitar to set up and illustrate *A Long Hard Day on the Ranch*. The rural and barnyard sounds in the familiar *The Tale of Peter Rabbit* and *The Tale of Benjamin Bunny* don't swamp the dialogue in order to make their point.

Each of the stories on these ten discs, from *Cinderella* to *Mud Puddle*, is given a sophisticated, first-class production, with the Mac interface used to it's best possible advantage. Kids won't be bored easily and neither will parents or instructors. The voices—some children's, some adults'—seem aptly chosen.

**Here's that Rainy Day**

While the Discis Books may seem to be aimed at the classroom and perhaps the day-care center, parents should welcome this program as yet another way to spend time with the kids doing something you'll both learn from and enjoy. Each disc includes a no-questions-asked one-year warranty. "Step on it? That's ok. Kids played baseball with it as second base? That's ok. Simply send back your disc with a money order for $4.50 (to cover postage and handling). . . . We will send you a new replacement disc."

The Discis Books can be purchased individually for from $69.95 to $84.95 and the complete library of ten discs is $750. This might sound a bit steep for home use, but have you priced the latest Nintendo games? And we needn't dwell too long on how many reading skills your kids and mine have picked up from arcade games. So, if you've been saving up for that rainy day or haven't spent all of Grandma's annual Christmas check, any one of these discs merits consideration. I recommend them without reservation. My own favorites are Robert Munsch's delightful tale *Thomas' Snowsuit*, and *Scary Poems for Rotten Kids*, by poet sean o huigin. The latter is suggested for eight-year-olds and up, so I qualify.—**Rod McKuen**

*See* **Where to Buy** *under "Santa's Spec Sheet."*

**Outliner and Presentation Program**

## MORE 3.0

**Pros:** Powerful, versatile outliner; allows user to control every detail of presentation; template libraries simplify chart creation. **Cons:** Problems may arise when upgrading from earlier versions; multitude of features makes user interface initially confusing. **Company:** Symantec Corporation. **Requires:** Mac Plus; hard drive. **List price:** $395; upgrade $50.

More 3.0 is the latest incarnation of the powerful package that's marketed as a presentation graphics tool but that's capable of doing much—well—more. More 3.0 contains a number of important new features for making state-of-the-

*(continues)*

art presentations; it also includes several significant user-interface refinements designed to make the program easier to use.

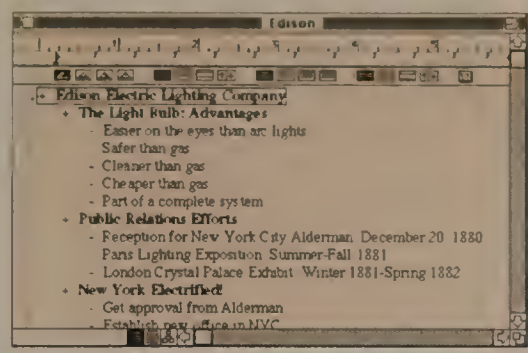
### More of the Same

More is built around an outline-style idea processor. Like all outliners, More allows you to organize ideas (called headlines) hierarchically and to rearrange them with the keyboard or mouse. Subheads can be attached to headlines so they're visible or hidden, depending on the amount of detail you want to view.

More's outliner is one of the most powerful you'll find. Organizational commands make it easy to do major surgery on an outline, and a variety of labeling options (including custom labels) allow control of the numbers, letters, and symbols that accompany headlines. Text editing, formatting, spelling checking, table of contents generation, and text- and graphics-importing features rival those of many word processors. The outliner even includes date and time stamps, sort and calculate functions, a Calendar command, and a phone dialer—features you're more likely to find in a personal-information organizer than in a presentation package.

Any outline in More is just a mouse click away from turning into a presentation. By clicking on the bullet-chart icon at the bottom of the outline window (or selecting Bullet Chart from the Outline menu), you switch to a different view of your outline: a series of bullet charts ready to be customized and displayed as a dynamic on-screen presentation, transformed into a set of color slides, or printed as a set of transparencies with accompanying lecture notes. An outline can just as easily be displayed as a tree (organizational) chart, which can be pasted into a bullet chart for use in a presentation.

To simplify the process of creating consistent presentations and outlines, More allows you to apply style rules to any level of the outline hierarchy. If you prefer to ignore the Rules menu, More automatically creates rules whenever you make style changes to your outline, bullet chart, or tree chart. Rules, templates, and graphic elements can be stored in menu-accessible libraries so they're easy to apply to different documents.




**Outline Your Thoughts** More's outlining capabilities allow you to formulate your thoughts in a structured fashion. By clicking on the icons at the lower left, you can transform your outline into a bullet chart or an on-screen presentation.

### There's Even More

More 3.0 adds new features to the outliner, including a ruler for creating custom tab stops, support for superscripts and subscripts, a command for suppressing headers and footers on the first page of a document, and user-interface modifications that make it easy to select and reformat multiple headlines with the mouse. These enhancements make the program more useful for creating text-based documents, although the outline-based user interface and the lack of features like multicolumn printing make it a poor choice for most word processing jobs.

If your work frequently involves the creation and modification of bullet-chart presentations, you'll appreciate More's new flexibility. Instead of having to return to the outline view to edit and format text and labels, you can use the text tool to change charts directly.

In general, More 3.0 gives you greater control over bullet charts than ever before. The package includes a wide variety of color and monochrome templates in libraries. The Browser menu allows you to quickly examine these templates; you can apply the one that best fits your presentation to the Master Page or any individual page.

If you cannot find the perfect template in any of the libraries, you can create or customize one using More's expanded set of graphics tools. Standard tools on the palette allow you to place text, lines, shapes, and bezier curves on charts. Others hide pop-up menus for controlling the exact placement, style, color, and pattern (including editable gradients) of text boxes, lines, frames, and backgrounds.

Since there's so much flexibility, it's easy for novices to become overwhelmed by choices. An innovative Chart Tutor command activates a sequence of dialog boxes that leads the user step-by-step through the basics of creating and customizing a presentation.

The most noticeable addition to More 3.0 is More Graph, an easy-to-use tool for turning arrays of numbers into charts and graphs. Rather than include this module in the More program, Symantec has chosen to make it a stand-alone program that resembles a spreadsheet program without the calculation capabilities. This separation of powers is surprising, given that so many diverse modules are already packed into More, but it's hardly noticeable when the two programs are run under MultiFinder.

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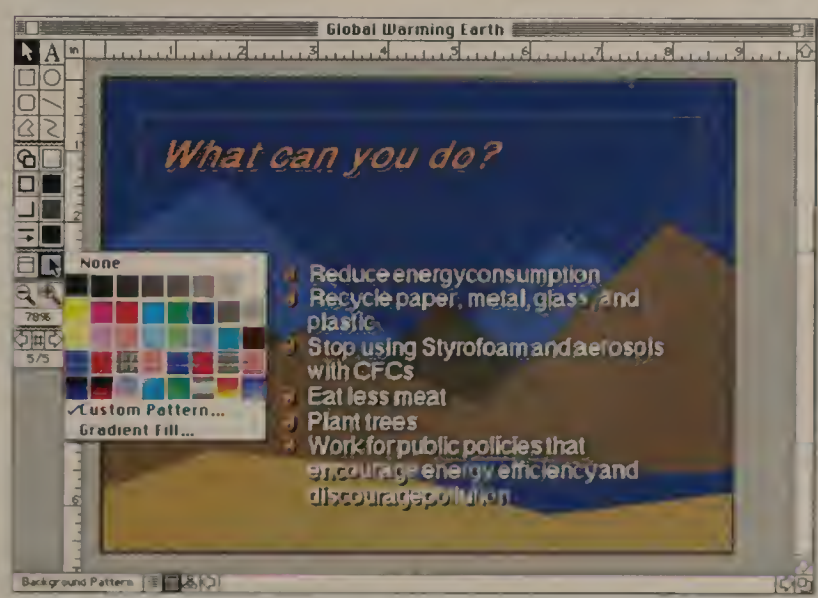



**Built-in Taste** More's built-in templates provide an easy way to present graphically pleasing presentations. Mastering the nearly identical row of rectangles in the palette, however, takes a bit of practice.

Of course, it's still possible to add text or graphics imported from other programs. More's extensive set of translators makes it easy to import text or graphics from just about any application you're likely to use.

**What More Could You Want?**

Unfortunately, not all of the changes in More 3.0 are clear improvements. An Installer program designed to make sure that all of your files end up in the right place may cause problems if you have a copy of More II on your hard drive. Users of Symantec's CompuServe forum experienced several annoying installation problems, including crashes and the replacement of More-specific icons with generic document icons.

I discovered another disturbing problem when I opened some of my More II documents with More 3.0. While outlines came through the file-translation process intact, bullet charts needed reformatting before they were presentable in the new program. Boxes that had framed the Mac screen now wandered mysteriously off the edge of the screen, and perfectly placed pictures were inexplicably relocated.

When I tried to correct the frame problem, I found my knowledge of More II to be less help than I'd hoped. More III's tool palette includes a bewildering collection of almost-identical rectangular icons hiding pop-up menus for controlling various formats. Other aspects of More 3.0's new user interface have been reworked too; I had to spend some time reading the manuals before I could approach my previous level of productivity with More.

**A Whole Lot More**

Over the years, I've used More to perform all kinds of tasks, from outlining works-in-progress to producing polished presentations. I've learned to live with the quirks that many new users find annoying and confusing. I've come to expect that each revision will provide me with a more powerful set of tools, but not without an initial cost. More 3.0 may have a few problems, but I'm not about to go back.

**—George Beekman**

*See* **Where to Buy** *or circle 785 on reader service card.*

Graphical Interface for CompuServe

## COMPUSERVE INFORMATION MANAGER 1.0

**Pros:** Provides easy-to-use graphical front end for CompuServe system. **Cons:** Slow; drops into terminal mode too often; buggy. **Company:** CompuServe. **Requires:** Mac Plus; second disk drive; modem. **List price:** $39.95; free to subscribers.

CompuServe Communications Software

## COMPUSERVE NAVIGATOR 3.0

**Pros:** Automates and speeds use of CompuServe; saves time and money online. **Cons:** Buggy; not all areas of CompuServe are accessible. **Company:** CompuServe. **Requires:** Mac 512KE; second disk drive; modem. **List price:** $99.95.

CompuServe provides hundreds of information services—but at a price. Its complex, difficult-to-learn system of commands and layers upon layers of text-based menus have discouraged many who have tried to use it.

CompuServe Navigator and CompuServe Information Manager (CIM) are two front-end programs that succeed in bringing a friendlier face to CompuServe. The two programs are complementary rather than competitive, Navigator being best for users who frequent the forums, and CIM working well for browsing through CompuServe's many other areas.

**Navigator 3.0.3**

Vastly changed since its last incarnation (see *Reviews, Macworld,* December 1988), the current version of Navigator adds many convenience features and addresses many of the shortcomings of version 2.1. But its basic mission hasn't changed: it connects to CompuServe, gets the information you want, stores that information on disk, and then disconnects to let you review the information while the online clock and the online charges aren't running. Navigator is mainly a tool for participating in the forum areas, sending messages, and downloading and uploading files. You can use the program to enter other areas of CompuServe, but it requires using a manual mode or learning Navigator's scripting language.

**Plan Your Session Online**

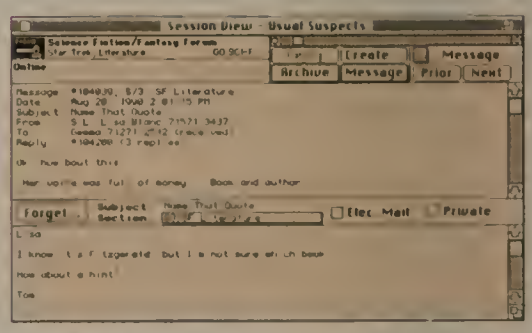
Using Navigator to access the forums is easy. The Navigator Database window contains tiles for each of the forum areas on CompuServe. Double-clicking on a tile opens a forum window with pull-down menus to control the action that Navigator will take in that forum. The Message menu allows you to specify which messages you want to get from the forum. The Library menu lets you scan the forum's data libraries for files to download.

While offline you can instruct Navigator to get your electronic mail and a listing of the current message topics (also called threads) and new files in the forums you've selected. Then you run a session. The program dials CompuServe, performs the tasks you've set, and disconnects. As you review the session offline, you'll reply to your electronic-mail messages, create new messages, mark interesting message topics for retrieval, and choose files to be downloaded. The next time you run a session, Navigator sends your replies, reads and stores the full texts of the message threads you've marked, and downloads the files you want (see "Answering Back").

**A Pretty Face**

Where Navigator takes a batch-oriented approach to tasks, CompuServe

*(continues)*




**Answering Back** Navigator makes it easy to reply to forum messages. Here I'm posing my guess to a question asked in the Science Fiction and Fantasy Forum.

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**SAN FRANCISC**

THURSDAY, JANUARY 10, 1991

POST STAFF ILLUSTRATION/KAREN SAMATIS

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The Mac keeps getting more and more exciting, with an ever-increasing array of applications! So we've expanded the conference program to reflect the exciting new areas where Mac is making inroads, and to keep you up-to-date on topics you always request.

Here's a quick look at what you can expect in San Francisco next January:

**State-of-the-Art Show-Starters** — spend Thursday attending your choice of 12 dazzling State-of-the-Art Sessions, each designed to provide you with an authoritative overview of the latest and greatest developments in each conference track (and a few surprise areas) — plus give you a taste of what the future might hold.

**Keynote Sessions** — begin Friday and Saturday with a fever-pitch of excitement at the MACWORLD Expo Keynote Sessions, featuring luminaries from the world of Macintosh, insights from industry leaders, and a classic example of just how much fun the Mac can be!

**Nine Conference Tracks** — following the Keynote Sessions you can choose from sessions in nine different topic areas. You'll hear: tips and tricks from users; developing trends from industry insiders; what's new and exciting in dozens of application areas; how to avoid pitfalls into which the unwary have stumbled; reviews on the latest software and hardware products; plus powerhouse pointers, time-saving ideas, terrific insider's tips, and much, much more!

**Application Workshops** — beef up your Mac knowledge on Sunday with a series of two-hour intensive learning sessions to provide guidelines, tips, and how-to's on the most popular uses of the Macintosh. Here's more about the Nine Conference Tracks:

**1. The Multimedia Mac** — sessions to dazzle and demonstrate the fabulously exciting integration of video, sound, and animation by the Macintosh — and how multimedia can benefit you.

**2. Designer Solutions** — sessions for architects, graphic artists, engineers, advertising agencies, and more, to maximize the usefulness of the Macintosh in design and conquer new worlds in color.

**3. The Mac in Entertainment** — one of the most exciting new application areas for the Mac, featuring sessions ranging from Desktop Video to the Mac in Hollywood.

**4. User Workshops** — introductory, for those just getting started with the Mac, or who need a quick, concentrated lesson on the most popular Mac applications; Advanced, where experienced users share their expertise to reveal hot new ideas and insider's tricks; and Software Review Sessions, for authoritative, unbiased overviews of the best-selling Macintosh software packages.

**5. The Mac in Big Business** — solid advice and case studies to help solve the unique problems of users in large organizations, along with discussions of the possible impact of developing trends and technologies in the Mac marketplace.

**6. Programmer/Developer Forums** — where veteran and novice techies gather to brainstorm, learn about innovative advances and techniques, and more.

**7. Special Interest Group Meetings** — sessions to serve the needs of users in a broad range of settings who are continually seeking new ways to prosper and profit from the Mac. Includes: Education Workshops — a golden opportunity for teachers and administrators from kindergarten through graduate school to learn how their colleagues across the country are using the Mac to great advantage; Home Office/Small Business Survival Guide — resources, recommendations, and how-to's especially useful to the Macintosh home office worker; plus sessions to highlight The Mac in Health Care and The Mac in the Law Office.

**8. The Lighter Side** — as well as being a business/education tool without equal, the Mac was designed to be fun! This track features sessions to keep a smile on your face and on your Macintosh's screen.

**9. Late-Breaking/Popular Demand Topics** — to keep our conference program (and you!) up-to-the-minute, we'll top off the agenda with sessions to reflect both special requests and the newest market developments. Included here will be the ever-popular MACWORLD Expo User Group Extravaganza (MUSE), the indisputably reliable source for users to share information, compare tips and strategies, discuss their concerns and problems, and get hard-hitting answers to questions.

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Information Manager is for browsing through the different areas on CompuServe. The General Services window shows 12 icons that represent the major groups of services. Clicking on one of these icons connects you to CompuServe and opens another window listing the services that make up the group (see "CIM Desktop"). Double-clicking on the name of a service takes you to it. If the service uses the Host-Micro-Interface (HMI) protocol, necessary to display information graphically, you'll be taken to a window with the information you want. If the service doesn't yet support the HMI protocol (and many don't), a Terminal Emulation window will open, which requires selecting from on-screen menus and entering keyboard commands. A serious deficiency in this mode is the absence of a feature for capturing information to a disk file. There is a capture buffer that you can select and copy from, but it is limited in size and doesn't warn you when it's full. If you're paying for the data you download, CIM's missing feature could cost you a lot of money.

Unlike Navigator, CIM can access the entire range of services on CompuServe. It provides good, easy-to-use access to the E-mail and weather sections. The CB Simulator, where people chat night and day, is terrific, allowing you to monitor several channels of talk while participating in another. CIM also has an excellent interface to the message and library sections in forums, actually making those areas easy to understand and use. Although overall I prefer Navigator's batch approach to forum messaging, CIM would be better for the beginner.

The CIM user's manual is very good, explaining not only the program but also how to use many of the information services that CompuServe provides. Browsing through the manual, I've learned about several areas that I didn't know existed.

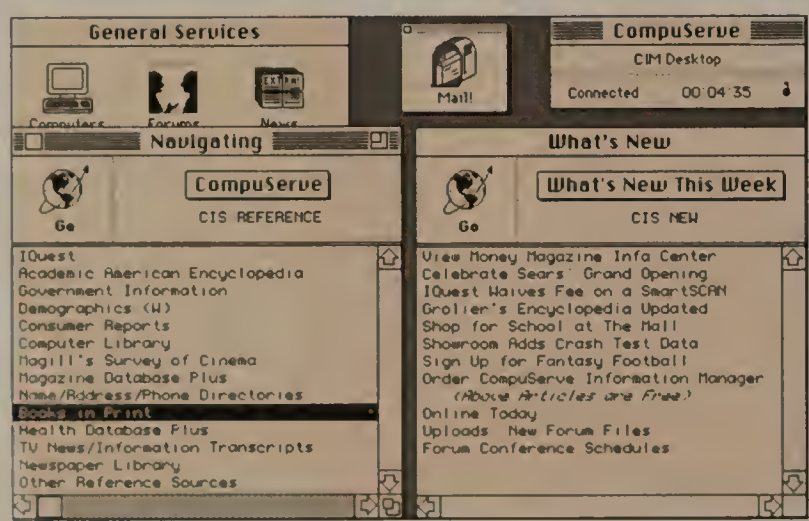
**Calling All Exterminators**

Using Navigator or CIM can be an exercise in frustration, because both programs are plagued by serious bugs. Navigator users have burned up the phone lines with complaints of crashes and freezes. Over the months that I used Navigator, I experienced several bombs, some of which hung me online, costing me extra money. Many CIM users have reported crashes of their own and have voiced complaints about the program's slow speed. CompuServe has been concerned and responsive to the problems, and both programs have had maintenance upgrades since the initial release. Updates to both programs are promised by the time you read this, and bug fixes may be downloaded for free from CompuServe.

**Navigating or Managing?**

Which program should you buy to best use CompuServe? Perhaps both. If you're new to CompuServe, or if you want to buy only one program, then CIM is your best bet. It accesses the entire service easily, and its browsing capabilities are more Mac-like. More experienced CompuServe users, especially those who spend most of their online time in the forums, will be better served by Navigator. It's optimized to spend as little time online as possible, saving you time and money.—**Tom Negrino**

***See Where to Buy or circle 718 (Information Manager), 719 (Navigator) on reader service card.***




**CIM Desktop** CIM gives CompuServe a friendly face; here it's telling me that I have electronic mail waiting, and is showing me the What's New messages. The Navigating window shows the choices from the Reference icon.

**AppleShare-Compatible File Servers**

## ALLSHARE 1.1

**Pros:** Processor priority can be set for either server or owner; size can be changed to accommodate more than four users. **Cons:** Access privileges apply to all attached disks. **Company:** Everyware. **Requires:** Mac Plus; hard drive; AppleTalk network; System 6.0.2. **List price:** $249.

## EASYSHARE 1.1

**Pros:** Publishes up to ten folders or disks at one time. **Cons:** No priority setting for server or owner; no size setting for additional users. **Company:** ShirtPocket Software. **Requires:** Mac SE; hard drive; AppleTalk network. **List price:** Version 1.1e $149.

## PERSONAL SERVER NETWORK 2.0

**Pros:** Owner of server can be required to log on for added security. **Cons:** Problematic installation program; non-intuitive interface. **Company:** Information Presentation Technologies. **Requires:** Mac SE; hard drive; AppleTalk network. **List price:** $149.

A network that doesn't require a dedicated computer to be the file server can be more convenient and less expensive to set up than one that requires a dedicated server. Although Sitka (formerly TOPS) made this type of network popular for small workgroups of between 6 and 12 users, it now has strong competition from allShare, EasyShare, and Personal Server Network (PSN).

All three products are designed to run in the background, providing file service to other users on the network while you use the Mac for regular programs. Each server is accessible with the AppleShare client software, which now ships with Apple's system software. (TOPS can't use the AppleShare client software; it requires its own desk accessory to access file

*(continues)*

servers.) allShare, EasyShare, and PSN differ in their setup and their access privileges.

### allShare

allShare's cdev has options for creating a log-on password, controlling access, and telling the processor to give priority to the server or the owner. You can restrict access to an entire disk, an entire disk except for one folder, or only one folder.

allShare's initial setup is for four users. If you want to support more than four concurrent users, EveryWare recommends increasing the memory allocated to the server by 5K for each additional concurrent user or allocating more of the Mac's processing time to the server by sliding the priority indicator toward the server end.

When I transferred files I noted very little time difference between the owner and server priority settings. After a discussion with the developers, it's apparent to me that server priority makes little difference for file transfers between a single client and the server. The server-priority setting does make a difference when several users are simultaneously accessing a multiuser database, for example.

Access to the disks or folders published by allShare is via the AppleShare client software. However, allShare's access restrictions apply to all disks (except floppies) that are currently attached to the server Macintosh. That means users can access any mounted disk if you provide unrestricted access.

### EasyShare

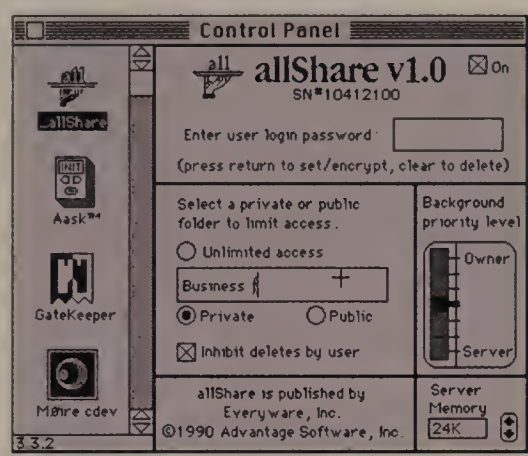
EasyShare offers the same functionality that allShare does. EasyShare is an AppleShare-compatible server that runs in the background. However, some of its features differ significantly from those found in allShare.

First, EasyShare lets you define a list of up to 20 folders that can be shared. Defining the folders, however, doesn't automatically make them shared folders—it simply creates a list of folders that can be published by the owner of the server. You can publish only ten folders or volumes from the list at any one time. You define and publish the list using EasyShare's DA.

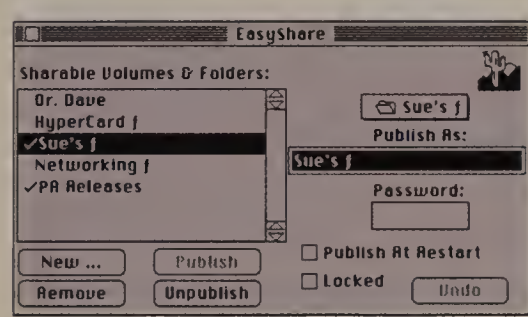
Second, EasyShare does not allow you to allocate more of the processor's resources to either the owner or the server. It has one set size (around 53K), and that size can't be changed to accommodate more users.

### Personal Server Network

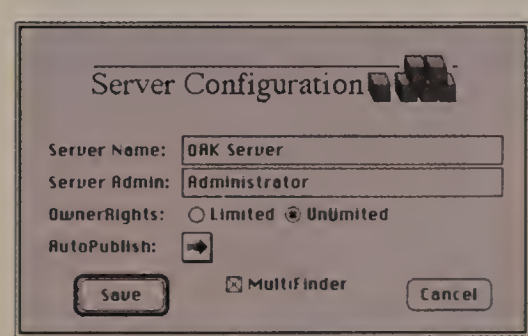
PSN supports the entire range of AppleShare access privileges for folders—Read File, Write File, Delete File, and See Folders (neither allShare nor EasyShare support all of these privileges). In addition, PSN has a Limited Access, or Loopback, mode that prevents anyone from accessing the Mac unless the owner is logged on.




**allShare** The server control options include publishing a volume or folder, password protection, the server-processing priority (slide bar at right), and the amount of system heap (server memory) to be used.




**EasyShare** EasyShare does everything through a DA. Here, a list of folders has been created; the ones with checkmarks before their names have been published for use by other users on the network.




**PSN** A server administrator can name the server and select volumes to be published at start-up. Note the Limited and Unlimited buttons for Access Rights—that's the Loopback mode.

By using the Limited Access, or Loopback, mode, you can use two Macs to test a multiuser database. When using Loopback, you can install the database on the background server. Two users can then log on to their Macs as users of the database. The 4th Dimension consultants I've spoken to find this a useful feature.

Because PSN is an application rather than an INIT, it must be the start-up application if you want folders or disks to be automatically made available to users. PSN must start up under the Finder rather than MultiFinder. The program does include an option to launch MultiFinder once PSN is started, but I find this atypical method a bit awkward.

There are other equally nonintuitive aspects to PSN's interface. Although PSN uses the standard SFGetFile list to display folders, you can't just select a folder to assign access privileges. You must first open the folder, and then assign the privileges. If you assign privileges to a selected folder at the desktop level, in actuality you're assigning privileges for the entire disk.

PSN's installation program can cause considerable problems. As with all background servers, PSN requires additional system heap to load. However, if you use PSN's preset heap size for the Mac and the server, you can actually end up with a smaller heap after you run the Installer particularly if you have increased the system heap to accommodate a few INITs before installing PSN. Instead of the preset values, you can enter a larger heap size when you run PSN Install.

### Picking a Server

Both allShare and EasyShare are winners as AppleShare-compliant servers. allShare's advantages over EasyShare and PSN are its ability to set the processing priority and its flexibility when setting RAM requirements according to the number of users. However, if you're looking for greater security for more than one folder or disk, EasyShare is the best choice. Because of the problems I had installing PSN, I can't recommend it.—**Dave Kosiur**

*See Where to Buy or circle 708 (allShare), 734 (EasyShare), 799 (PSN) on reader service card*

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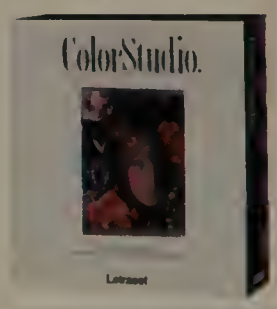


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Precision Drawing Program

# MACDRAFT 2.0

**Pros:** Easy to learn; plotter drivers and symbol libraries available; clean interface. **Cons:** Some conveniences missing. **Company:** Innovative Data Design. **Requires:** Mac Plus; second disk drive. 2MB RAM, hard drive recommended. **List price:** $299.

MacDraft 2.0 is a major extension of the original, a program first released in 1985 and a popular competitor of MacDraw II and Canvas. Although MacDraft can be used for CAD-like tasks—it serves, for example, for basic architectural drawing or mechanical design—it omits many of the facilities that Innovative Data Design (IDD) put into Dreams, its principal CAD offering. The company's aim in MacDraft was to bring precision drawing to people who have an occasional rather than everyday need for such a program; as such the program has been successful with legions of occasional drafters and also, surprisingly, with business users, who use it as an alternative method for creating presentations. MacDraft needed an update to compete with newer standards in drawing programs, but the good news is that IDD was able to introduce new features without making the program harder to learn. (See "Insights on MacDraft 2.0" in this issue for more information.)

### Easy Virtue

The problem facing a developer of drawing programs is to find a way to arrange all the possibilities without bewildering the new user with a variety of drawing options and tools. In MacDraft, the drawing palette has a simple, assortment of icons, but more-sophisticated drawing tools appear when the user holds the mouse button down on an icon choice (see "Optional Power").

The advantage of this arrangement is that, first, the program is at least usable for simple drawings by absolute neophytes, and second, it allows IDD to add new features while keeping a clean user interface. Under the freehand drawing icon, for example, are bezier curves and splines, two features new to MacDraft 2.0. As a beginner, you can do freehand line doodles as you might in any other Macintosh paint or draw program; for more advanced use, you can dip into the completely rewritten manual (more thorough than the already impressive original) or comprehensive online help and find out exactly what splines are and how to use them. Pull-out icons also support common drawing options. MacDraft 2.0 thus extends the ease-of-use of the original program to features that were formerly the domain of high-end CAD.

### Filling It In

Besides a new arrangement of fill patterns that allows custom fill patterns (black-and-white and color), the new MacDraft supports the full 24-bit color standard. MacDraft now supports standard symbol libraries (two sets of general graphics and a special architectural library) and offers, aside from the expected PICT2, a proprietary drawing-storage format called PictScript. PictScript is basically a version of encapsulated PostScript that lets you manipulate images (crop and resize) on screen; you can also paste drawings into word processor files and retain PostScript-like printing with smooth curves and quality laser-printed grays. Text handling now supports the full set of Mac text attributes, and you can customize line styles (including dimensioning lines.

More significant than these improvements is a provision for layering, a virtual necessity in a serious drawing program. You can jump rapidly from one layer to another, even on a Mac Plus, copying elements from prepared reference layers of your own custom symbols if you like.

### Blank Spaces

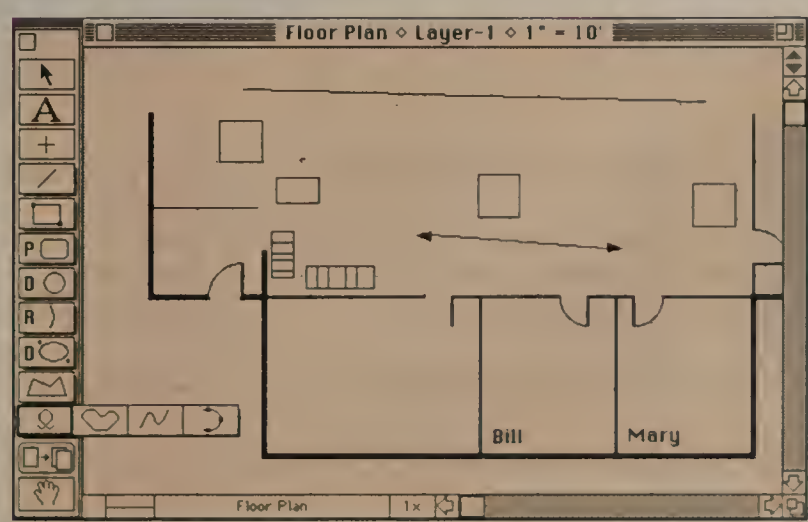
While it's nearly the ideal program for the casually precise or the precisely casual, it's not a program for those whose normal employment situation calls for an ankle chain connected to the leg of a drafting table. MacDraft's dimensioning, for example, is impressively simple, but it doesn't offer the across-layer flexibility of dimensioning in IDD's own Dreams or Graphsoft's MiniCad+. Similarly, although the program's drawing elements are objects, the object-manipulation facilities (add, subtract, glue) aren't as complete as a CAD program's. While PictScript is lovely, a serious CAD program should have translators for DXF and other standard formats. Thus, if your job consists of designing 300 kinds of metal parts cranked out from a numerically controlled milling machine, buy something else; if you need to do precision drawings for business or scientific presentations, or even prepare preliminary drawings for an injection-molded plastic part a few times a year, MacDraft is superb.

### Bottom Line

If on a Friday afternoon you are assigned to produce your first technical drawing by Monday morning, you can't find a better program than MacDraft 2.0. Optional plotter support ($129) and symbol libraries ($39 to $99) make the program even more attractive. It is quite deliberately not a universal drafting solution, but it's an effective solution to a wide range of beginning to advanced drawing problems.

**—Charles Seiter**

*See Where to Buy or circle 770 on reader service card.*




**Optional Power**
The shadowed icons in the MacDraft 2.0 drawing palette pull out sideways, revealing more options. The freehand drawing modes shown here are freehand lines, closed shapes, bezier curves, and spline curves

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Writer's Reference

# INSIDE INFORMATION 1.0

**Pros:** Easy to use; extensive database of defined terms; good idea generator; vocabulary builder. **Cons:** Needs a lot of space on hard drive; cumbersome, nonalphabetized word groupings; sometimes makes bizarre associations. **Company:** Microlytics. **Requires:** Mac Plus; System 6.0; hard drive with 700K available for minimum installation or 3.5MB for full installation. **List price:** $119.

Microlytics calls its Inside Information DA "the first new classification system for language in nearly 150 years." I call it an antidote to writer's block.

The program is an interesting hybrid: part idea generator, part thesaurus, and part dictionary—sort of. What it really is, is a loosely structured labyrinth of words and meanings. You might just as easily find a gem as get lost, quite literally, in information. But if getting lost is part of the problem, it's also part of the program's appeal.

Inside Information is a collection of more than 65,000 terms, briefly defined, whose subject matter ranges from the mundane to the esoteric. The terms relate to everything from mathematics and medicine to social interactions (including insults), the arts, linguistics, and even slang.

The program is divided into seven general classes: Nature, Science & Technology, Domestic Life, Institutions, Arts & Entertainment, Language, and the Human Condition. These classes are further divided into 20 subclasses and 125 categories, which are broken down yet again into 700 subcategories, each defined by subject matter (see "The Graphic View").

### Reverse Dictionary

Inside Information is a desk accessory with a pivotal feature called the Reverse Dictionary. You enter a brief description or keyword, and the program comes up with a list of words that most closely relate to the description you specified. Select any word from the list, and you're given a brief definition of the word. Or if you want to see the hierarchical structure of where the word fits in the program, you can choose one of three view options—Outline, Graphic, or Tree.

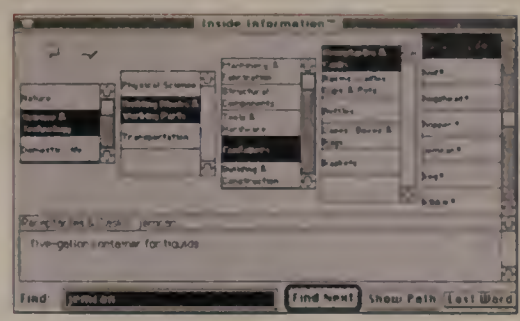
If I'm writing an article on ships, for example, and want to make sure I haven't left anything out, I could use the Reverse Dictionary to key in the word *ship*. The program comes back with a list of 181 words related to seafaring boats, including: *head wind, bunker, Long Tom, watch, whaler,* and *barnacle*. This list of nautical terms gives me the inspiration boost I need, and I'm happy.

But not so fast. In another case, let's say I'm writing a medical paper and have momentarily forgotten the word *glaucoma*. This time I type the words *eye disease*. The program searches and comes back with five interesting matches but not the exact match I had in mind. It lists the terms *multiple sclerosis, amblyopia, jaundice, ophthalmology* and *ophthalmologist*. *Glaucoma* is not on the list. On the other hand, typing in the word *eye* brings up a list (albeit not alphabetical) of 154 entries, including *glaucoma*. This list includes everything from *blinkers* to *bony orbit*.

Because the Reverse Dictionary uses a keyword search without regard for context, the program sometimes comes up with just the right associations and sometimes with connections that are surprising—even downright bizarre. In the *eye* example, the list that included glaucoma has every word in the 60,000-word dictionary that contains the word *eye* in its definition. That could include *mole,* a mammal known for its poor eyesight.

Inside Information defies the direct approach. If you can put up with its idiosyncratic twists and turns and don't mind its seemingly haphazard groupings of words, you might enjoy browsing as a way to build your vocabulary. Better yet, you may find it an excellent tool to help generate ideas while writing an article or story.

If you want to meander off to explore a word, you can save your place by using Inside Information's Save Bookmark command. This saves a record of your location from anywhere in the program, even after a system shutdown. You can use up to 30 bookmarks at a time.




**The Graphic View** You can use a graphic, tree, or outline view to trace any of the words back through the program's hierarchical structure. This example shows the nested categories in which the words *harness cask* fit, and traces them back to the general class of Science & Technology.

Inside Information is a DA, but its sheer size (it takes a whopping 3.5MB to run the full version) can be daunting. If you have really limited hard drive space, the program can be run without Reverse Dictionary or definitions, but there wouldn't be much point without these key features.

The program contains some explicit material, which you can delete if you find it offensive.

### Floorshows, Hendiadys, and Syzygy

While the interface is easy to use, at first I found the occasionally strange or irrelevant connections made by the Reverse Dictionary bothersome. *Floorshows, hendiadys,* and *syzygy,* for example, are all on the list when I type the word *conjunction*. Typing the word *alimony* produces even more startling results. Its list of three consists of *alimony, alimony,* and *alimony*. When selected, each instance of the word displays a slightly different definition. Annoying redundancy or information junkie's dream?

Inside Information's search times are not a serious problem, but the program could use a boost in speed. Currently it takes nearly a minute to do a Reverse Dictionary search on 181 records using a fairly loaded Mac SE with 2.5MB RAM and a 20MB hard drive.

Microlytics plans to release a version soon that runs faster and uses less disk space—significantly less, I hope. The company also plans to include the next version in its InfoDesk series of reference works, and Random House is currently planning a book version of the program.

It's hard to fight the exhilaration

*(continues)*

of discovery, and when it comes down to it, that's what Inside Information is about. Each time I used the program, I learned a few new words, and frequently a new idea or two. Despite the program's overwhelming size and cumbersome approach, I found it not only useful but at times fascinating.

At $119, Inside Information is a little more expensive than a good dictionary. Most writers won't regret the investment, because after all, what Inside Information does best is offer an alternative to the blank page.

**—Mary Margaret Lewis.**

*See Where to Buy or circle 752 on reader service card.*

Bulletin Board Software

## TELEFINDER GROUP EDITION 2.0

**Pros:** Easy to use and install; Finder-like interface; high-speed data transfers supported. **Cons:** No online help or file-search utility. **Requires:** For host, Mac Plus; hard drive; Hayes-compatible modem. For user, Mac 512KE; Hayes-compatible modem. **Company:** Spider Island Software. **List price:** 20 users $375; 80 users $575; 250 users $1250; site licenses available. Upgrade from version 1.0 free.

Your desktop computer can be a gateway to the world of online services. You can now find the best flight to the next Macworld Expo, download that game you just read about, or "talk" with a friend across town, all with your computer and an online service. From giants like CompuServe, GEnie, and Prodigy to small bulletin board systems (BBS's), the benefits of telecommunications are now available to anyone with a computer and a modem. Users, however, are often intimidated by the thought of setting up a BBS.

First, there are all the settings: speed, protocols, the commands the service requires; and layered on top of those your own telecommunications application. Most services, having started in the DOS world, require users to type at a prompt. Fortunately, the new online services are more icon driven—notably, America OnLine and Connect.

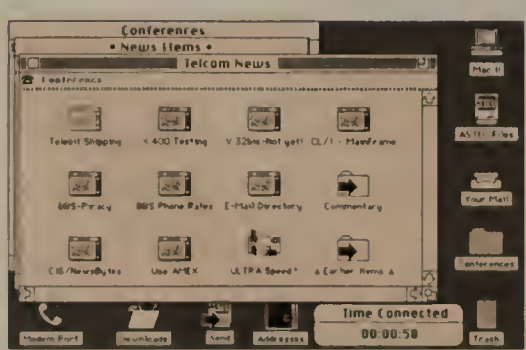
TeleFinder is the first commercial BBS system with a graphical user interface. Other BBS packages such as Second Sight (formerly Red Ryder Host) from FreeSoft, WWIV Mac BBS (shareware), and 1stBBS from 1st Desk Systems run from command-line prompts. TeleFinder, however, mimics the Macintosh; it's like using the Finder. It's all intuitive, and I found it easy to operate. To download and copy a file, just drag it; to open a document, double-click on its icon. Just as you would expect.

### The Perfect Marriage

TeleFinder consists of the Group Edition Host program, the TF/User program, and some utilities. The Group Edition Host runs the BBS, while the TF/User is distributed to all BBS users. This union of host service and client software produces a seamless product that is easy to understand. It's something many users and sysops have wanted for some time.

The TF/User software isn't a general-purpose telecommunications package. It's meant to be linked with the Group Edition Host BBS. If you try to use a standard telecommunications package to log on to TeleFinder, the host provides a simple command-line prompt for standard terminal emulation. Spider Island offers a separate product called TeleFinder Personal Edition for commercial services.

**TeleFinder's Desktop** TeleFinder uses icons for files, folders, and directories.




**Online Conferences** This screen shows the structure of an online conference. You double-click on a document to enter the conference.

TeleFinder supports up to six phone lines, and up to 57,600 bits per second. One user commented on TeleFinder's exceptional data-transfer rates using the new 9600-bps modems. TeleFinder uses a name-password combination (entered in a dialog box) and also supports callbacks for increased security. Each user is tracked by a unique identification number allowing the user's online activities to be monitored and time billed.

Setting up the BBS with Group Edition Host is easy. You create a public directory and a set of conference folders, copy a Preferences file that matches your modem's specifications, and create a database of users and their IDs. Modem settings and other configuration options are preset, but the defaults can be changed using the Modem menu. Your BBS can provide mailboxes, public messages, and conferences.

### In Conference

As a BBS member, you can browse through directories by double-clicking on their folders, download files by dragging them to the Download icon, and upload files by selecting the file and dragging it to the appropriate directory or conference. You can receive mail, and send mail to anyone whose name appears on your screen. I really like being able to upload and download files and send mail without going through the hassles of matching protocol specifications.

TeleFinder supports conferences similar to CompuServe's. You can read and reply to messages in a conference and also post messages.

TeleFinder is the easiest bulletin board system that I have seen. You can even use ResEdit to customize an interface, changing icons and screen layouts to personalize your own BBS. User groups should consider TeleFinder, as should consultants and support staff in small businesses. The high-speed data transfers might also be of interest to service bureaus for graphics file transfers. It would be great if all telecommunications were as easy to use as TeleFinder.

**—Barrie Sosinsky**

*See Where to Buy or circle 830 on reader service card.*

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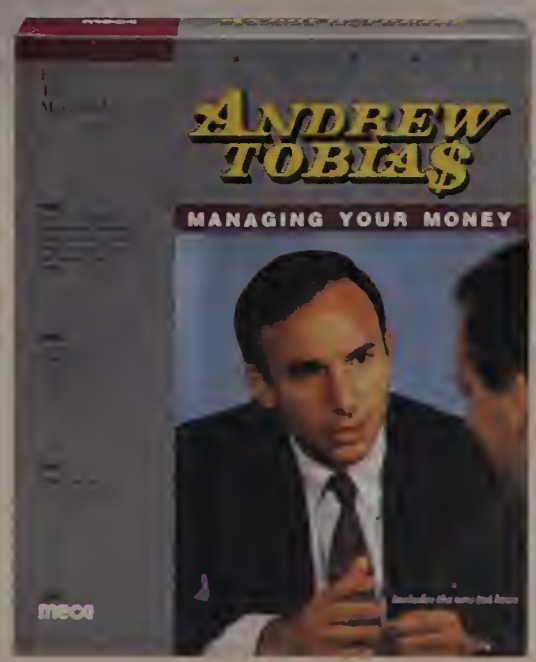


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— Macweek, 9/13/88

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Circle 37 on reader service card

Calendar and Appointment DAs

## ALARMING EVENTS 1.0

**Pros:** Supports keyboard equivalents for launching; includes archiving of old reminders; outputs reminders for use with CalendarMaker. **Cons:** Recurring reminders are not highlighted in calendar; reminders with a duration of more than one day are displayed only on first day; no built-in support for launching macros; each reminder limited to maximum of 255 characters. **Company:** CE Software. **Requires:** Mac Plus; System 6.0.2. **List price:** $129.95.

## SMART ALARMS 3.0 WITH APPOINTMENT DIARY 3.1

**Pros:** Can be used to launch macros; different sounds available for different reminders; can be configured not to interrupt certain applications; user can define special layouts for diary; includes search facility for finding text; outputs reminders for use with Cambridge Z88 portable computer. **Cons:** Two separate DAs; can turn off reminders for no more than three hours; each reminder limited to maximum of 200 characters; no keyboard equivalents for launching DAs. **Company:** Jam Software. **Requires:** Mac Plus. **List price:** $125.

If you're looking for a way to organize your life and feed your calendar into your Mac, two new programs, Alarming Events and Smart Alarms with Appointment Diary, go a long way in providing you with the power to do just that.

Both are desk accessories that allow you to enter appointments into a calendar file and set reminders based on those appointments. The major difference between the programs is that Alarming Events is a single DA, while Smart Alarms with Appointment Diary is a pair. Smart Alarms handles the setting of reminders and the notification chores, and Appointment Diary is the calendar DA.

### Getting Scheduled

Both packages present you with a view of the current month as the starting point. Clicking on the desired date opens up an area for entering the text of your reminder. Then, if you wish, you can leave the text as a to-do item for that day, or assign a time to the text and make it a reminder.

Appointment Diary is only a calendar DA; it doesn't actually create reminders. To create a reminder you select the text you want to be reminded of and type ⌘-R; this launches Smart Alarms and transfers your selected text to it, creating a new reminder. You then set the date and time for the reminder. You can even have Smart Alarms create multiple reminders, one for each line of the selected text.

Alarming Events arranges your reminders chronologically. Appointment Diary lets you enter and display text in a free-form manner or define your own layout. You might use the latter option to create an hourly layout for appointments during your work day, for example.

The two packages also allow you to set recurring appointments, such as "tennis every third Thursday of the month." Alarming Events, though, doesn't display those reminders as bold dates in the monthly or yearly views. And if you assign a duration for any appointment that is more than one day (your vacation, say), Alarming Events doesn't display that appointment on subsequent days.

### Getting an Overview

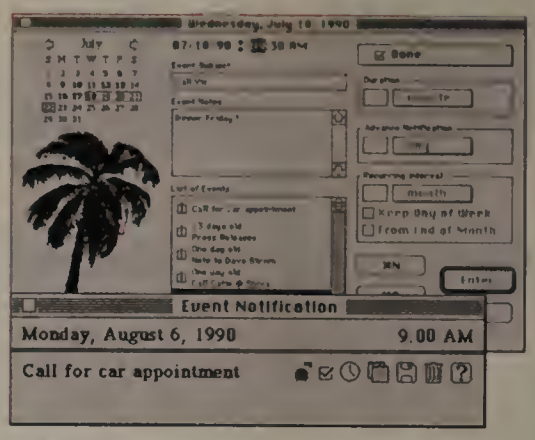
Both DAs allow you to view your schedule on a daily or a weekly basis. Alarming Events displays any five consecutive days of your choosing, while Appointment Diary shows you the seven days of the week, Sunday through Saturday. Both programs display a monthly view; with Alarming Events you can also choose a yearly view. Appointment Diary attempts to include part of the text in the monthly view, but I haven't found that to be very useful—it only works with small reminders.

### This Is Your Wake-Up Call

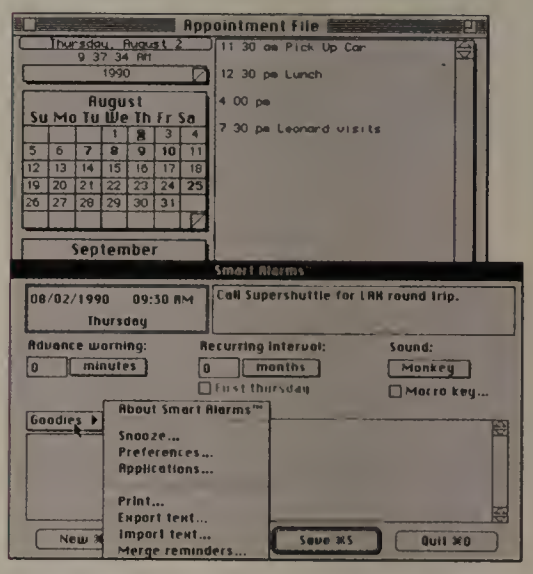
You can direct Alarming Events to present a reminder in one of four different ways: a pop-up alarm, a flashing alarm, a timed event, or a to-do event. Only the first two include some type of notification. The pop-up alarm will display your reminder in a dialog box, regardless of the program you're in, and optionally play a selected beep sound. The flashing alarm sounds a selected beep and flashes the Alarming Events icon atop the Apple icon of your DA menu.

Timed events in Alarming Events don't include an active notification but show up in the list of events for that day in the calendar. To-do events are treated essentially the same way, except that they include only a date,

*(continues)*




**Alarming Events** This composite screen shot includes Alarming Events' basic data entry/display window (called the event window), along with a typical reminder window (lower window). Alarming Events uses a smaller window (without the tree) for Mac SE–size monitors. The icons to the right of the alarm clock in the reminder window represent the following actions (left to right): check event as done, postpone event, open event window (for editing purposes), archive event, and trash (delete) event. A pop-up menu explaining the different icons is generated by clicking on the question mark icon.




**Smart Alarms** This composite includes the calendar window from Appointment Diary along with a reminder entry box from Smart Alarms. The calendar window's schedule of times (11:30 am, 12:30 pm, 4:00 pm, 7:30 pm) can be selected as a layout for future dates before any entries are made.

Version 2.0 For Macintosh*

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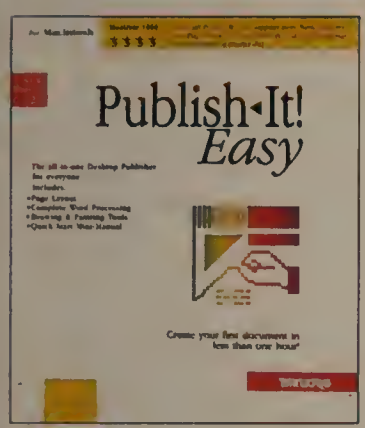


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March 1990

Auction!! Auction!! See this month's Topic on Page 7

Making a bootable disk
or a sure cure for the "unable to load ProDOS" syndrome

So you have been downloading all those games and utilities but can't get them to run. I had the same problem. I had downloaded a few applications from local BBS'. All I had were many files on the disk. I had no idea what to do with these files. I hope this short article will help.

Many downloaded files are not bootable applications. For instance, you cannot run (boot) a file that has a filetype of TXT. And, all those graphics files are not bootable either. Still, most files with a filetype of .SYS and .BAS and some with a filetype of BIN are bootable files. There are several ways to get these files to run.

You could "get into Basic" and run the files from Basic. There is another way that is a lot better. You have to make a bootable disk. For this article, I am going to confine the bootable disk to ProDOS 8 applications. So this method will not work

] goto page 8

Using Appleworks *the book..*

Book Review
By George Murphy

This is being written to review the book (manual) "Using Appleworks" by Elaine and Arthur Aron. This is the 3rd edition of the book and does cover Appleworks 3.0. Whenever I look at, or get, a technical manual I first study the Table of Contents, to see what it covers, the Index and the Appendix. This manual is well laid out and covered the subject in a logical manner. One appendix summarized the changes in Appleworks v.3.0 and if you are well versed in earlier Appleworks you can go to just these sections.

Word Processing, Data Base and Spreadsheet each had their own group of chapters. The first chapter of each group was a "quick start" write up that covered the basics with the following chapters going into all the details and functions. Following good communication practices the

] goto page 3

WDEF Virus *Beware!!*

Disinfectant 1.5 is a new release of our free Macintosh virus detection and repair utility.

Shortly after the release of version 1.4, a new strain of the WDEF virus was discovered. Version 1.5 has been configured to recognize the new strain. Version 1.5 also contains code to detect and repair other strains of WDEF which may exist but have not yet been reported.

Disinfectant 1.5 is available now via anonymous FTP from site acns.nwu.edu [129.105.49.1]. It will also be available soon on sumex-aim, comp.binaries.mac, CompuServe, Genie, Delphi, BIX, MacNet, America Online, Calvacom, and other popular sources for free and shareware software.

The following text is extracted from the new section on WDEF in Disinfectant's online document. It describes what we know to date about this new virus. The description has been expanded to include new information that has recently become available.

The WDEF virus was first discovered in December, 1989 in Belgium and

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Meeting Schedule
6:30 PM ..... Doors Open
7:00 PM ..... Review Items
7:30 PM ..... Auction Begins
8:30 PM ..... Break
8:40 PM ..... Door Prize Drawing
8:45 PM ..... DOM Demo
9:00 PM ..... Auction Continues
9:45 PM ..... Wrap Up

Location
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not a time, and are carried forward from day to day until they're marked as done; old to-do's are displayed with the added text "nn days old," so you can see just how far behind you really are.

Smart Alarms has only one notification style, a pop-up dialog box (called a Nag) that can be accompanied by the sound of your choosing. The Nag box includes the text of your reminder as well as information about how long you've delayed acting on it.

### Taking It With You

Hardly anyone spends all of his or her time in front of a Mac, even if it's a Mac Portable. There are times when you'll want to take a paper copy of your schedule with you, and both packages let you print selected information in a usable format.

Alarming Events lets you select which types of events will be printed: pop-up alarms, flashing alarms, timed events, to-do's, or events marked as done. You can choose from four time periods—today, this week, this month, and this year—or you can select a date range.

Appointment Diary lets you select a range of days (starting with the current date), weeks, or months. If you've created a special layout for the calendar but there are no entries for some days, those days can be skipped in the printout. You can also export reminders to the Cambridge Z88 portable computer, which can be pretty handy for road trips.

### Keeping Time

I've found that both programs do an adequate job of reminding me when tasks should be done. If you use a lot of reminders, I'd recommend Smart Alarms, since you don't have to clutter your calendar with them. Smart Alarms also makes it easier to find a reminder, since it presents a scrolling list of all reminders, sorted by date and time. The search option in Appointment Diary is also helpful. I use it to find out when I've called or visited a particular person.

Alarming Events provides a somewhat cleaner interface for setting appointments, since it's integrated into one DA. But you have to do more work to find an old reminder or appointment in Alarming Events because it doesn't provide any search facilities for those appointments.

All in all, I've found the user-definable layout in Appointment Diary to be more helpful in organizing my day. That, along with its search option and its ability to transfer appointments to my Z88, make Smart Alarms with Appointment Diary the time manager that I use.—**Dave Kosiur**

***See Where to Buy or circle 707 (Alarming Events), 817 (Smart Alarms) on reader service card.***

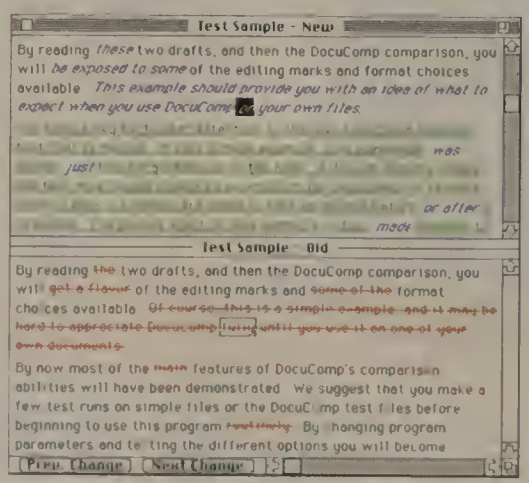
Document-Comparison Utility

## DOCUCOMP 1.5

**Pros:** Adds color, support for additional file formats, new search and navigation capabilities, and new reading options.
**Cons:** Doesn't track font, style, or size changes or preserve them on screen or in the saved comparison document.
**Company:** Advanced Software.
**Requires:** Mac 512KE. Hard drive strongly recommended. **List price:** $159.95.

In a world where programs are fiercely multifunctional and feature-laden to the point of bewilderment, DocuComp is a breath of fresh air. Its sole job is to compare two versions of a document and report on changes between them, and this it does very well. Now, with this upgrade's addition of color and other enhancements, it does it even better.

Color on computers is usually discussed in terms of snazzy graphics, but color can be helpful to users of text-based programs as well. DocuComp is a case in point. In version 1.5, color isn't cosmetic, it's a real productivity aid (see "With Color . . . Without Color").




**With Color . . . Without Color** Color makes a world of difference to the DocuComp comparison process. In the color screen, blue represents insertions; red, deletions; and green, moved text.

As in the previous version, DocuComp still compares two versions of a document via a proprietary split-screen environment. The process is as simple as selecting the new and old versions of a document in a dialog box and clicking the Compare button. The new version appears in the upper pane, the older version in the lower pane. Using the Previous Change and Next Change buttons, you can review changes one at a time. You can also make a composite of both files and print various reports—in color, if you have access to a color printer.

Access to DocuComp 1.5's color option is through the Screen Style dialog box in the new Customize menu. Red, green, blue, cyan, magenta, and yellow can be used to highlight insertions, deletions, and text that has been moved. You can choose which colors you want to denote each type of change in the document. If your document will be read by someone who doesn't have a color monitor, you'd be best advised to use color in combination with traditional text-highlighting devices, such as strike-through and italics.

Previously, the only way to move around a document or find a particular piece of text was to use the scroll bar. This made for imprecise navigation, and searches proved tedious, especially in the small, split-screen window. With version 1.5, searching is as simple as typing a word or phrase in the Find dialog box.

Another enhancement is the ability to filter out various word processing minutiae from the overall comparison process. You can, for instance, choose to ignore hard page breaks inserted to cause a printer to stop and eject a page; hidden text, which some word processors, such as Microsoft Word, allow the user to insert in a document; automatic paragraph and footnote numbering; and any specific character.

With this upgrade, Advanced Software has made a special effort to

*(continues)*

satisfy government workers and users of Symantec's More. The latter group can now include or exclude headlines, speaker's notes, and headers and footers when outlines are compared with DocuComp. And changes can now be marked with revision bars only (on the left or right side of the page), to satisfy a specific government-reporting requirement.

### More Widely Read

DocuComp 1.5 now reads Microsoft Word 3.0 and 4.0, WordPerfect 1.0, WriteNow 1.0 and 2.0, MacWrite II 1.0, and More II and More 3.0, plus ASCII and program listings, making it a more versatile tool than its predecessor was. But not all of DocuComp 1.5's features are available to all of those word processors. For example, neither WriteNow nor WordPerfect support color, and MacWrite II doesn't support line numbers. These features are currently available only when printing directly from DocuComp, not in the saved composite document.

DocuComp 1.5 packs a bit more weight than did previous versions, up from 384K to 512K. If you routinely compare more than ten pages under MultiFinder you might need to experiment with increasing the memory allocation to maintain optimum comparison speed. The rule of thumb is simple: the more pages you compare, the more memory you'll need.

### No Font Tracking

DocuComp has at least one deficiency that still needs to be addressed—its inability to track font, style, or size changes or to preserve them on screen or in the saved comparison document. However, Advanced Software says that this enhancement is at the top of the list for version 2.0, due out in early 1991.

The upgrade package also comes with two free utilities: ScriptComparer, a utility for comparing HyperCard stacks; and Addresses & Envelopes 1.0, a desk accessory for storing addresses, notes, and phone numbers and for quickly printing envelopes. With or without the freebies, DocuComp is a good program that keeps getting better.—**Philip Bishop**

***See Where to Buy or circle 731 on reader service card.***

**Forms-Design Software**

## IF:X FORMS DESIGNER 1.1

**Pros:** Brilliant, bold concept; extremely easy to revise forms; allows precise positioning of text within cells. **Cons:** For design only (no data entry); slow screen redraw; poor text-block handling; confusing interface. **Company:** SoftView. **Requires:** Mac Plus. **List price:** $279.

With such major players as Claris and Adobe vying for shares of the 116-million-dollar forms processing market, it seems strange that professional forms designers are still using page-layout programs (see "Forming Opinions," *Macworld,* February 1990). The people at SoftView think they know what the problem is and they even say they have a solution.

It's called if:x Forms Designer (pronounced *IFFix,* for some reason). Unlike its rivals, this program is for design only—you can't fill out an if:x form unless you print it and find a pencil. Because SoftView is best known for its MacInTax income-tax preparation software, you might expect if:x to be based on the same forms-display technology; oddly enough, it isn't. To put it mildly, nobody's seen anything like if:x before.

### The if:x Approach

Most Mac forms programs are cousins of MacDraw, an object-oriented graphics program. That is, every element of a form is a distinct graphic object on screen, individually resizable and reshapable. Adapting MacDraw to forms design seems like a smart idea—after all, forms consist of rectangles, lines, and text, at which object-oriented programs excel.

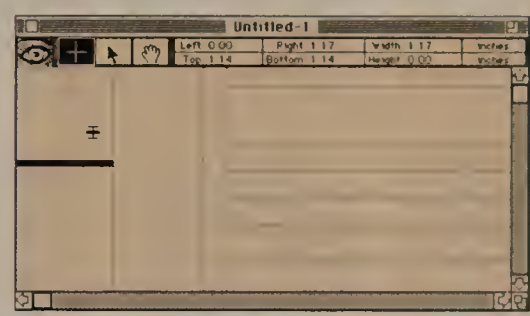
In practice, however, these programs are almost more trouble than they're worth (so the thinking at SoftView goes), because forms get *revised*—inevitably and frequently. To move one object in a MacDraw-style program, you have to move several others to make room. And to make room for those objects, you have to move still other objects—you end up practically redesigning the form.

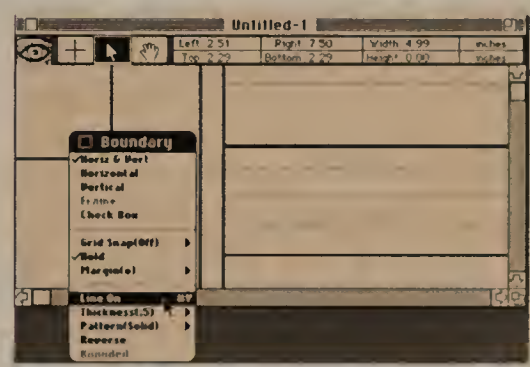
if:x completely rejects the object-oriented approach. Instead, it offers a unique cross between a spreadsheet and Microsoft Word's table-generation feature. The Mac's blank screen is the canvas. Using a special cursor, you chop this space into subdivisions that roughly approximate the rectangular structures of a form (see "Formative Stages"). Each click produces a horizontal or vertical dotted line, depending on which way you drag. In this way, as though cutting up a cake, you create rectangular cells. Depending on whether or not you opt to add a printable border to any of these conceptual dotted lines, the cells become the elements of the form—blanks, straight lines, text boxes, or just white space.

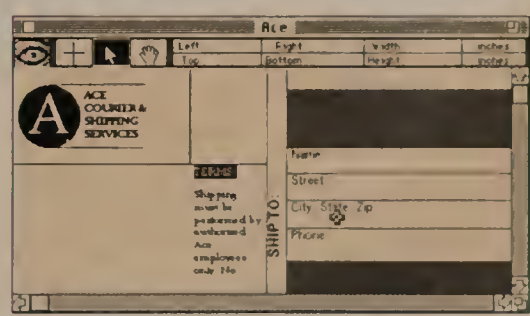
### Revisions Revisited

The beauty of this system is that no cell is an island; enlarge one, and all

*(continues)*




**Formative Stages** You define the basic structures of a form by adding conceptual boundaries (top). Once you've done that, you use tear-off menus to add printable lines to certain boundaries (center). Finally, you add text, shading, and other touches (bottom). There are automatic features for creating check boxes and leaders (such as dotted lines). You can zoom in or out as you work, and you can export the form as an EPS file.

the others adjust to make room. Decrease the height of one row in a table, and all the other rows slide up to take up the slack. The program was born for revision-hungry forms designers.

Furthermore, because the program always maintains the relative positions and sizes of the cells, all kinds of instantaneous "what-if" options are available. While designing a laser-printable form on a relatively low-resolution Mac screen, for example, you can select a minimum text size (such as 9-point) for on-screen viewing. Any text smaller than that jumps to 9-point so you can read it, and all the parts of the form remain in formation. When you print, all text returns to its original size.

For the exacting designer, there are a number of specialized positioning features. Every cell has a margin all the way around its inside perimeter; you can make any one margin thicker or thinner, thus adjusting the position of whatever text you enter there. With one command, you can rotate whatever text or pasted-in graphic the cell contains. (You can even edit rotated text—sure enough, the I-beam cursor flips on its side.) You have great control over text size and leading, as well as line thickness and shading.

### Conceptual Difficulties

Unfortunately, radical change often comes at a price. if:x Forms Designer's biggest problem is what first appears to be an amazingly simple interface. There are only three tools: one for creating cells, one for selecting, and one for moving. But because there are many elements you can select or move (cell walls, cell margins, text, white space, graphics), the cursor changes to identify what you're selecting. In fact, there are 13 different cursors. Each one produces a different kind of highlighting when you click with it. To this confusion, add the fact that your screen resembles a grid; so you also need a way to select one cell wall, an entire horizontal line, a whole table, and so on. The upshot is that if:x has enough modifier keys to hold down, and multiple-click shortcuts to learn, for ten programs. In one circumstance you're asked to Option–quadruple-click to select cells.

Furthermore, in an effort to eliminate the awkwardness of needing one tool to select something and another to move it, each of the three tools has been given some of the features of the others. This complication leads to some awkward moments. If you select a cell and then switch to the cell-creation tool, you're stuck because the cell-creation tool can't deselect something. To get rid of the highlighting, you have to switch back to the selection tool to deselect the highlighted cell before returning to the cell-creation tool.

**True to Form** The only way to evenly space lines you have created is by snapping them to a grid. Unfortunately, each form can have just one grid. If you change the grid-line spacing, anything snapped to the original grid suddenly snaps to the new spacing. Therefore, the check-box table in the lower-left corner can't have narrower spacing than the address region at the top of this form (unless each line is positioned by hand).

### Iffy Text

There are two other unfortunate side effects of the program's cell concept. The first is screen redraw: it's slow. With every adjustment, resizing, or alignment, the program repaints its screen; a form like the one in "True to Form" takes over 10 seconds per redraw on a Mac IIcx. On a Mac Plus, the program is almost unbearably slow.

The other problem is text. Because of the program's spreadsheetlike character, the Tab and Return keys are reserved for moving around a form. Therefore, each paragraph of text must reside in its own cell. You can't create tab stops, and you can't indent, unless you put the first line of text in its own, shorter cell. (Whatever you do, don't follow the manual's advice to create indents by typing spaces. Using the space bar for text alignment is asking for disaster at laser-printing time.) You can't create justified paragraphs, either. These limitations rule out the creation of many medical, legal, and insurance forms, where text plays an important role.

### Keeping Informed

Many of if:x Forms Designer's problems are typical first-release glitches. The friendly and articulate manual, for example, shows menu commands and dialog boxes that don't exist. Text entry (especially backspacing) and switching from one tool to another are very slow. There's no color or gray-scale support, and pasted graphics can't be resized or cropped.

Yet there's something irresistible about the program's concept: all elements of a form are interrelated. While it's true that the constantly shifting chunks of the form make it almost impossible to precisely duplicate an existing paper form, initial sketching and revisions are an incredible, enjoyable breeze. No, the current program isn't ready for prime time. But wait until SoftView fixes the speed, text, and tool problems (as they'll undoubtedly do) and adds the ability to enter data (as they've promised to do). if:x may yet fulfill its revolutionary promise.—**David Pogue**

*See Where to Buy or circle 748 on reader service card.*

Finder-Level File-Compression Utility

## DISKDOUBLER 3.0

**Pros:** Brilliant concept; fast, stable, trustworthy; very simple interface. **Cons:** Can't extract single files from compressed folders; uses only one icon type for compressed files. **Company:** Salient Software. **Requires:** Mac Plus. **List price:** $79.

It's a strange phenomenon: over time, a hard drive somehow fills to capacity, no matter how big it is. For many Mac users, the problem is an accumulation of files that aren't used every day, but aren't worth transferring to floppies.

Now, with the proliferation of file-compression utilities, there's a possible solution that doesn't involve buying another hard drive. The idea is to encode files in a much smaller,

*(continues)*

Marc Daniels

Michael Andersen

Angie Burhop

Joe Tolerico

Lynn Prather-Hallums

Debbie Branflick

Kelly Warren

Barbara Gasparetti

Brian Hoppaugh

Ana Diaz

Chris Deschu

Carolyn Douglas

Scott Godin

Tina Ferensic

Robin McAteer

Lori Schaible

Gregg Getchius

Denise Moran

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Debbie Philips

Henry Nowinski

Art Akerson

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Glenn Stine

Bill MacLaney

Corey Maywald

Sharon Daniels

Jay Franetovich

Thomas Rie

Robin Lynn Hoffman

Rob Licursi

Anne-Marie Senchuck

Diane Vacca

# 35 Good Reasons to Purchase from CDA Computer Sales

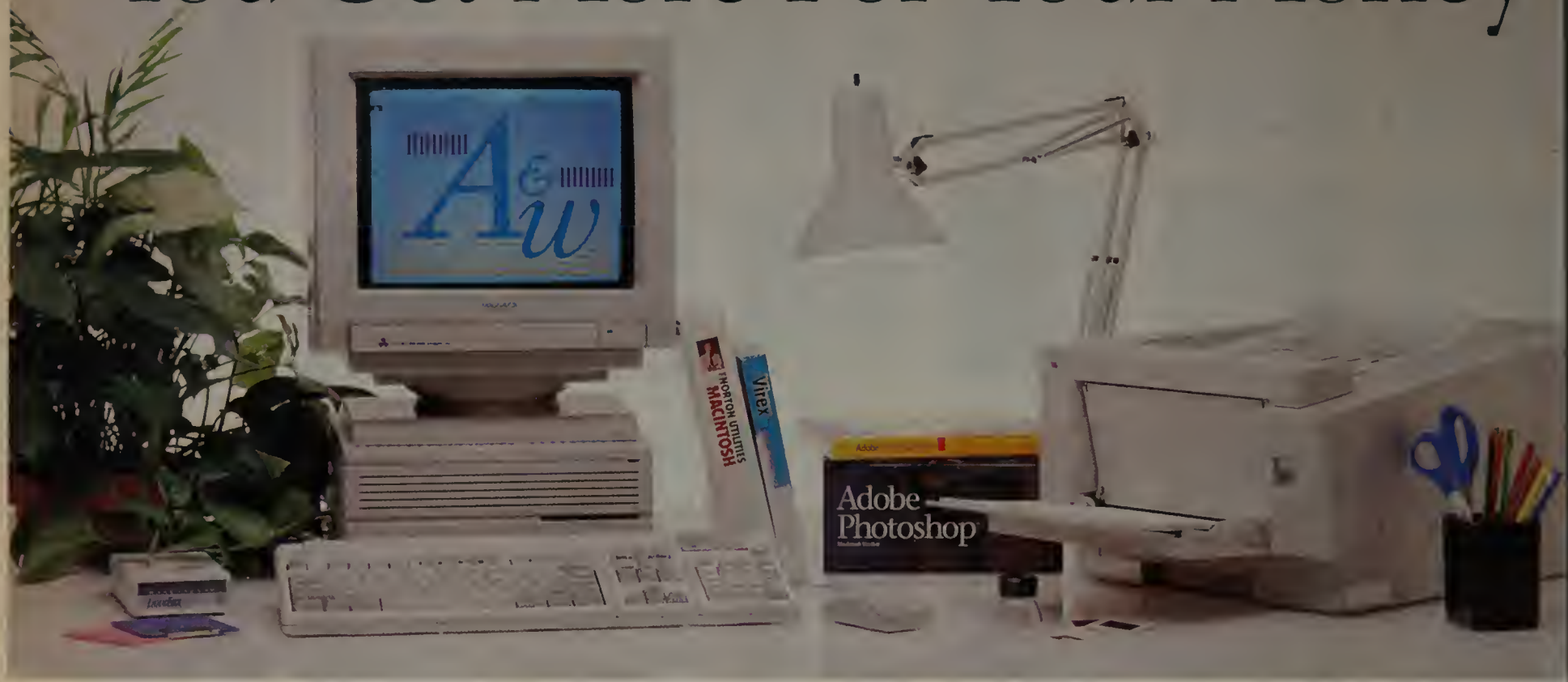
We can give you lots of good reasons to purchase your Macintosh, peripherals and software from CDA. But we feel the personal service and attention you receive is the best reason of all. *At CDA your satisfaction is the bottom line.* From our knowledgeable sales staff and customer service representatives, to our technical support team and warehouse crew, every order receives personal care, from start to finish.

Of course, top notch quality service doesn't come easily. Ten years of experience in computer mail order has helped us to achieve this high standard of service. Since 1980 CDA has been serving customers worldwide. Growing along with the personal computer industry has enabled us to provide the knowledge and experience necessary to help you get what you need, when you need it, at the right price—with full support and service.

*It's our people that make the difference!*

## ....These are the People of CDA

# You Get More For Your Money




CDA, the leader in complete Macintosh solutions, offers systems that are truly complete and ready-to-run. When you purchase your Macintosh system from CDA, you will receive *top quality* components, free tech support, free software and loads of extras! We invite you to compare — when you do you will find you're getting the most for your money at CDA.

## CDA Power Systems include:

- Microtech Nova Hard Drive *with 5 year warranty*
- Norton Utilities, First Aid, World Map, Close View, MacroMaker, Total Recall
- Demos of Microsoft Excel, 4th Dimension by Acius, Opcode's Vision & Cue
- Virex *by Microcom*
- Adobe Type Manager
- 6 Outlet Surge Protector
- Mouse Pad, 10 Diskettes, Disk Storage Box, and a System Dust Cover Set

## Lease a Macintosh System for as little as $50.52 per mo.*

*Qualified businesses based on 60 mo FMV lease
**Qualified businesses based on 48 mo FMV lease

### Mac SE/30 Power System

- Macintosh SE/30 CPU
- Microtech Nova 40 Mb Internal Quantum Hard Drive
- 2 Megabytes of RAM
- DataDesk 101 Keyboard

**Plus**, all of the items listed
Ask for Package #9012
**Only $88.09 per mo.***
**System Price $3,689**

### Mac IIci Power System

- Macintosh IIci CPU
- Microtech Nova 120 Mb Internal Quantum Hard Drive
- 4 Megabytes of RAM
- DataDesk Switchboard
- Magnavox 14" RGB Monitor

**Plus**, all of the items listed
Ask for Package #9008
**Only $147.87 per mo.***
**System Price $6,199**

### Mac IIfx Power System

- Macintosh IIfx CPU
- Microtech Nova 170 Mb Internal Quantum Hard Drive
- 4 Megabytes of RAM
- DataDesk Switchboard
- Magnavox 14" RGB Monitor w/8-bit Video Card

**Plus**, all of the items listed
Ask for Package #9053
**Only $219.03 per mo.***
**System Price $9,199**

The New Macintosh Classic is an excellent choice for first-time Mac buyers who want the essential features of a Mac in a complete, affordable system.

### *NEW!* Mac Classic Holiday Starter System

- Macintosh Classic
- 40 Mb Internal Hard Drive
- 1.4 Super Drive
- 9" Built in Monitor
- 2 Megabytes of RAM
- Keyboard & Mouse
- Virex Software
- Adobe Type Manager
- 6 Outlet Surge Protector
- (10) Diskettes
- Disk Storage Box
- Mouse Pad
- Olympia NP-30 Printer (ImageWriter Compatible)
- 6 ft. Printer Cable
- Package of Paper
- Extra Printer Ribbon

Ask for Package #9100
**Only $50.52 per mo.****
**System Price $1,789**

### *NEW!* Mac IIsi System

- Macintosh IIsi CPU w/40 Mb Apple Internal Hard Drive
- 1.4 Mb Super Drive
- 2 Megabytes of RAM
- Microphone
- DataDesk Switchboard
- Magnavox 14" RGB Monitor
- Virex & Adobe Type Manager
- 6 Outlet Surge Protector
- Disk Storage Box
- (10) Diskettes, Mouse Pad

Ask for Package #9110
**Only $89.75 per mo.***
**System Price $3,749**

### Free! Paper Kit

A $20 value free with any laser printer from CDA. This kit includes hundreds of laser papers and envelopes from around the world. New recycled laser papers too! To purchase this kit separately or to receive a free PaperCatalog, call PaperDirect at 1-800-A-PAPERS.

### Personal LaserWriter NT Printer Package

- Personal LaserWriter NT
- 6 ft. Printer Cable
- Printer Dust Cover
- PaperKit *by PaperDirect*
- Package of Paper (500)

**CDA Price $2,495**
Ask for Package #9078

### HP DeskWriter Pkg

- HP DeskWriter Printer
- 6 ft. Printer Cable
- Printer Dust Cover
- Package of Paper (500)

**CDA Price $899**
Ask for Package #9077
*Add Freedom of Press for true postscript compatibility.*

### ImageWriter II Printer Package

- ImageWriter II Printer
- 6 ft. Printer Cable
- Printer Dust Cover
- Extra Black Ribbon
- Package of Paper (500)

**CDA Price $475**
Ask for Package #9070

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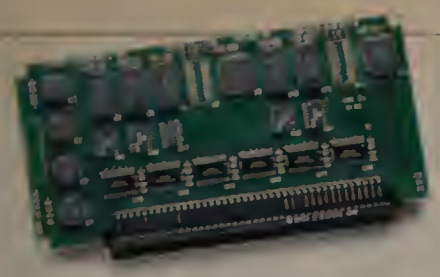


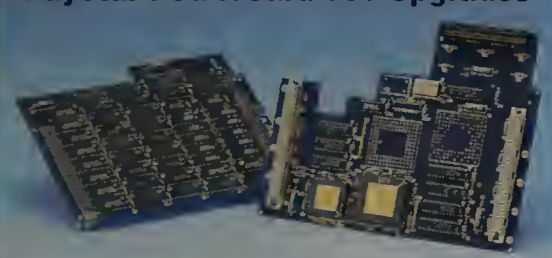
### Xceed Cache Card by Micron

Improve the performance of your Mac IIci by as much as 40%. The Xceed Cache Card allows you to eliminate the 68030 wait-states by using 128k of direct mapped static RAM. Easily plugs into the IIci cache connector & comes complete with cache control software.
Five Year Warranty ..... **$349**

## Speed up Your Mac!

Dove System 7.0 Upgrade ..... $459
DayStar PowerCard 030 25 MHz (II,IIx) .... $1095
DayStar PowerCard 030 25 MHz (IIcx) ..... $1495
DayStar PowerCard 030 40 MHz (II,IIx) .... $1645
DayStar PowerCard 030 40 MHz (IIcx) ..... $1995
DayStar PowerCard 030 50 MHz (II,IIx) .... $2245
DayStar PowerCard 030 50 MHz (IIcx) ..... $2595
SCSI Powercard 1Mb (expandable to 4Mb) $1349
RAM PowerCard 8Mb (expand. to 64Mb) .. $1499
DayStar Fast Cache IIci ..... $279

### DayStar PowerCard 030 Upgrades



Your Mac II will gain incredible speed and performance with a DayStar PowerCard 030 Upgrade. No added memory expense and easy to install at your home or office. Cost effective, with a range of speeds for every need and budget (25, 40 & 50 MHz) ..... *see listing*

## Printers

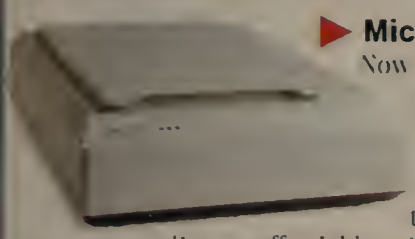
ImageWriter II w/cable ..... $459
Olympia NP-30 w/cable ..... $289
LaserWriter IINT w/cable and toner ..... $3395
LaserWriter IINTX w/cable and toner ... $4495
Personal LaserWriter NT w/cable ..... $2475
Kodak Diconix M150 + w/ATM & cable . $529
QMS PS-810 w/cable & toner ..... $2995
QMS PS-820 Turbo w/cable & toner ..... $4695
QMS PS-410 w/cable & toner ..... $2199

## Printer Accessories

The Organizer by CoStar ..... $189
The Organizer Jr. by CoStar ..... $69
LabelWriter by CoStar ..... $185
Apple LaserWriter II Toner ..... $109
ImageWriter II Sheet Feeder ..... $189

## Scanners

Abaton Scan 300/GS ..... $1479
Logitech ScanMan 32 ..... $379
Thunderware ThunderScan ..... $169
Microtek MSF 300GS w/SCSI ..... $1559



### Microtek 300ZS

Now you can get a scanner that handles it all; color, gray-scale, line art, even text — *and* get it all at an affordable price. You can scan continuous tone photos at up to 300dpi while recognizing 256 shades of gray. For color input, the 300ZS delivers 24 bit color images. Comes with scanning/editing software, built-in SCSI *plus* ColorStudio & ImageStudio by LetraSet. .... **$1899**

## Upgrade Your Mac!
## Now $59 per Mb

*Fast 80ns SIMMs*
2 Mb Upgrade
(Plus - SE) ..... $118
4 Mb Upgrade
(SE/30 - Mac II) .... $236
4 Mb Upgrade (IIfx) $399
CDA Tool Kit ..... $19

All CDA upgrades come complete with an easy to follow instruction manual. If you should have additional questions, simply contact a CDA technician for immediate on-line assistance.

## Mac, MIDI & More

Make music with your Macintosh! You don't have to be an experienced musician to use EZ Vision— it was designed for hobbyist, educators, and the entry level musician. With EZ Vision, a MIDI instrument, and the Professional Plus MIDI interface, you can create and edit your own musical composition. EZ-Vision is a simple, yet powerful musical tool.

**Opcode**
EZ-Vision ..... $99
MIDIplay ..... $48
Vision V1.1 ..... $339
Studio III ..... $269
Professional Plus MIDI Interface. ... $59
Editor Librarian ..... call
EMU Proteus Editor Librarian ..... $139
Korg M1,M3R, T-Series Galaxy Librarian $169

**Coda**
Finale V2.01 ..... $549
Music Prose ..... $189

**DigiDesign**
Audio Media ..... $799
MacProteus ..... $789
MacProteus w/EZ-Vision ..... $869
Deck ..... $299

**Passport Designs**
Alchemy ..... $429
Encore ..... $365
Pro 4 ..... $299
Sound Exciter ..... $49
Trax ..... $59

**Pyware**
MusicWriter ..... $89

**Scorpion**
Sybil ..... $219

**SoundQuest**
MIDI Quest, Universal . Editor Librarian $159

**Mark of the Unicorn**
Performer V3.5 ... $365
MIDI Time Piece . $365

Performer and MIDI Time Piece Bundle ..... $719

## Order via CompuServe's Electronic Mall

Visit CDA's Macintosh database featuring complete systems, add-on hardware, software & accessories. "**GO CDA**" Watch for weekly specials!

## Hot Multimedia Tip

Do your multimedia presentations lack punch? Incorporate the excitement of music with *MIDIplay*, new from Opcode Systems. It's an easy to use MIDI playback device that allows a soundtrack to be played alongside your Macromind Director, HyperCard or SuperCard files. You can create your own soundtrack with EZ-Vision and you can even have the sound come directly from your Mac's speaker with Passport's Sound Exciter. For additional information on how to enhance your multimedia presentations with music, contact one of CDA's Mac/MIDI consultants.

## The World's Fastest Macs

are those that are shipped via DHL to over 190 countries in the world. DHL is the official international shipper for CDA Computer Sales. Please call for rates.

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### *One Year Performance*

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The Magic of Mac, The Power of People

# CDA Computer Sales

# The Best Macintosh Hardware

## Macintosh Portable

Macintosh Portable w/1 Mb & 40Mb HD .... $4195
Numeric Keypad ..... $59
Prometheus 2400 Baud Travel Modem ..... $199
AE DataLink MacPortable w/Send Fax ..... $199
1 Mb Upgrade ..... $369
2 Mb Upgrade ..... $749
3 Mb Upgrade ..... $1149
Generation Systems Portable Publisher ..... $449

### DoveFax Desktop

The DoveFax is a complete communications solution! It combines a 9600 baud fax modem and a 2400 baud Hayes compatible data modem into one compact unit. It performs true background operation allowing you to convert, send, and receive faxes while you continue working. The pre-scheduled transmission feature allows you to send faxes after hours when rates are lower. ..... **$279**

## Modems

Abaton Interfax 24/96 ..... $399
AE DataLink Express 2400 External ..... $169
AE DataLink Express w/MNP-5 External .... $199
AE DataLink Mac Internal (Mac II) ..... $199
Zoom 2400 Baud w/cable & software ..... $129
Prometheus 2400 Baud Internal (Mac II) . $199
CompuServe Information Service ..... $23
CompuServe Navigator 3.0 ..... $49

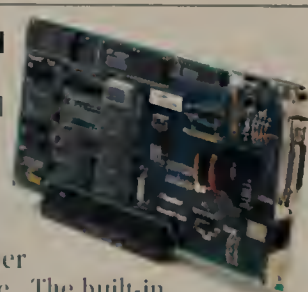
### Prometheus ProModem 2400

This full featured 2400 baud external modem is AT-command compatible and comes complete with MACKNOWLEDGE communications software and cable. The nonvolatile RAM allows you to stores numbers and your favorite configurations for immediate access. ..... **$189**

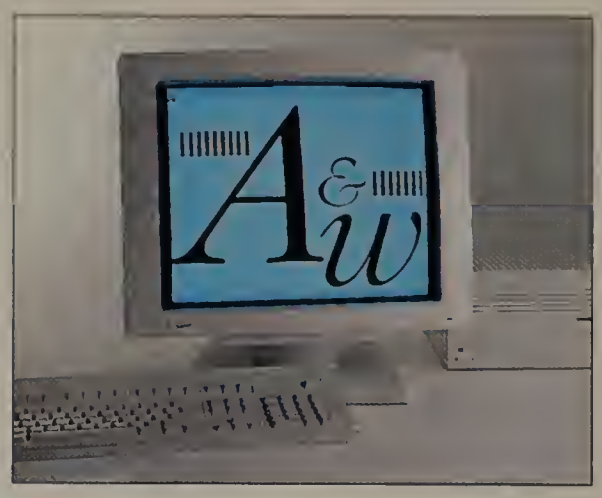
## Networking

Farallon PhoneNET StarController 300 ..... $825
Farallon PhoneNET StarController EN ..... $1599
Farallon PhoneNET Connector (DIN-8) ..... $29
Farallon PhoneNET Connector 10-Pack ..... $198
Farallon PhoneNET Repeater ..... $315
Farallon Timbuktu 3.1 ..... $95
Farallon Timbuktu/Remote 1.01 ..... $123
Farallon Timbuktu/Remote Access Pack ..... $845
Dayna Communications DaynaTalk PC ..... $209
Dayna Communications EtherPrint ..... $349
Asante MacCon+ IIET ..... $334
Asante MacCon+ SE/30ET ..... $334

### PhoneNET Card for Ethernet



Now Mac SE/30 and Mac II family users can use the increased speed and bandwidth of Ethernet running over ordinary phone wire. The built-in, 10BASE-T transceiver lets you attach twisted-pair phone cable directly to your Mac — no external connector or transceiver needed. (Timbuktu software included) ..... **$439**

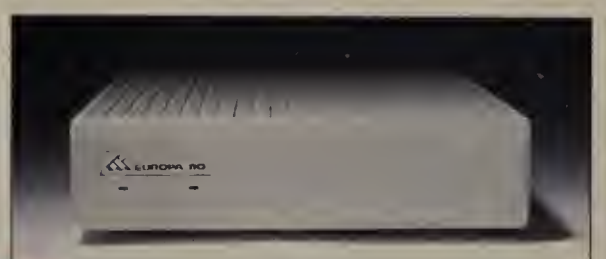



### The Rival 19" Monochrome Display *by Mega Graphics*

*MacWorld Magazine* rated the Rival the top performing WYSIWYG big screen — outranking dual-page displays costing much more. "Its darkened-glass screen effectively enhances contrast and reduces glare" *MacUser Magazine.*
Rival 19" Monochrome w/video card ..... $1199
Rival 19" Gray Scale (Mac II) w/video card $1995
Rival 19" Gray Scale (SE/30) w/video card . $2169

## Monitors & Video Cards

Magnavox Mac Color 14" RGB ..... $459
NEC MacSync 14" Color IIC ..... $499
Apple High Resolution 14" RGB ..... $799
E-Machines ColorPg T-16 w/video card ... $2149
Radius Pivot Display w/Interface Card ..... $1415
Ikegami CT20 20" Trinitron w/8 bit card $2799
Ikegami 19" Gray Scale w/8 bit card ..... $1499
RasterOps 8L 19" Trinitron w/8 bit card . $4569
RasterOps 24L 19" Trin. w/24 bit card .... $5999
RasterOps ColorBoard 264 (Mac II) ..... $589
Micron 8-bit Video Card (Mac II, SE/30) .. $349
Apple Display Card 8.24 ..... $719
Generation Systems Publisher SE Card ..... $369
Generation Systems 24 bit Video Card ..... $1999
**Video Upgrade** - Upgrade your 4-bit Video Card to 8-bits and display up to 256 shades of gray or color simultaneously ..... $89

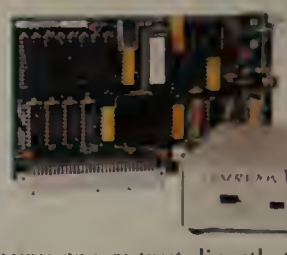


### Europa Series *by Microtech*

Built for economy without sacrificing quality, the new Europa Series feature capacities from 20 to 100 Mb (see listings below).

## Drives

Microtech Europa 20 Mb External ..... $399
Microtech Europa 40 Mb External ..... $479
Microtech Europa 80 Mb External ..... $679
Microtech Europa 100 Mb External ..... $809
Europa SyQuest 45 Mb Removable ..... $699
Additional 45 Mb SyQuest Cartridges ..... $85
*Quantum Internal w/software & bracket*
40 Mb Internal 19ms w/5 yr warranty ..... $449
80 Mb Internal 19ms w/5 yr warranty ..... $719
105 Mb Internal 19ms w/5 yr warranty ... $779
170 Mb Internal 19ms w/5 yr warranty ... $999
IDS Wip 20 Mb External ..... $399
IDS Wip 40 Mb External ..... $479
DaynaFile Single 360K Drive ..... $499
DaynaFile Dual 360K/1.2Mb Drive ..... $719
CD Technologies CD-ROM Drive ..... $649
CD-ROM w/Microsoft Office Bundle ..... $1099



### Video Adapters *by Generation Systems*

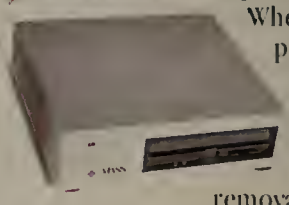
Now you can output directly to a television and/or VCR for color display and video recording.
**TV Board** is an 8 bit video card and NTSC output in one. Installs in the NuBus Slot of any Mac II and displays up to 256 colors ..... **$459**
**TV Box** is an external NTSC output device which uses the RGB signal generated by Apple's color video boards to reproduce 256 or 16.7 million colors at once w/Apple's 8 or 24-bit cards. . **$279**

### Mass Microsystems QuickImage 24

QuickImage 24 features a live preview window which lets you see the incoming video images.

With QuickImage 24 you can instantly capture 24-bit, full-motion, color or 8-bit grayscale images and import them directly into publishing, presentation, and graphic applications. ..... **$699**

### Mass Microsystems DataPak



Whether you're doing desktop publishing, generating mounds of spreadsheets, or producing thrilling desktop videos, you need a DataPak. The DataPak removable cartridge drives are an easy way to add storage capacity at an affordable price. Each drive comes with a free copy of DiskDoubler software and two year warranty.
DataPak (SE footprint) ..... $769
DataPak Duet ..... $1569
DataPak II (Mac II, IIx, IIfx footprint) ..... $899
DataPak II Duet ..... $1599
DataPak IIcx (Mac IIcx, IIci footprint) ..... $825

## Input / Output Devices

DataDesk Mac 101 Plus ..... $135
DataDesk Foreign Language Keyboard ..... $159
Mouse Systems Little Mouse ..... $75
Kensington Turbo Mouse ADB ..... $109
Altra Felix ..... $119
Wacom Tablet ..... Please call for pricing
Kurta Tablet (8 1/2" x 11") ..... $279
Microseeds WristMac (Executive Model) ..... $189

### Switchboard *by Datadesk*

Arrange your keyboard layout into a position that is most comfortable for you! DataDesk's Switchboard is designed for right and left handed users and is compatible with both Macintosh and IBM computers ..... **$175**
*Trackball & Function Key Option Available*

# & Software Available

## Accounting
atOnce V1.0 by Layered ..... $282
Classic Accounting by Absolute Solutions ..... Call
Simply Accounting V1.1 by Bedford ..... $222
TimeSlips III V2.0 by TimeSlips ..... $169

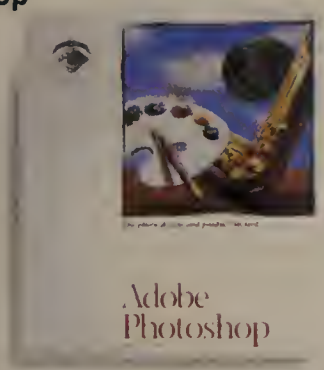
## CAD
DesignCad 2D/3D by ASBC ..... $389
MiniCad+ V2.0 by Graphsoft ..... $509
Vellum V1.0 by Ashlar ..... $699

## Communications
Liaison V2.06 by Farallon ..... $169
Microphone II V3.0 by Software Ventures .... $215
WhiteKnight V11.02 by Freesoft ..... $85

## Connectivity
Access PC by Insignia ..... $79
LapLink Mac III by Traveling Software ..... $125
MacLink Plus/PC V4.5 by Dataviz ..... $129
Soft PC V1.3 by Insignia ..... $259

## Database
4th Dimension V2.01 by Acius ..... $469
Double Helix III by Odesta ..... $359
Filemaker II V1.1 by Claris ..... $229

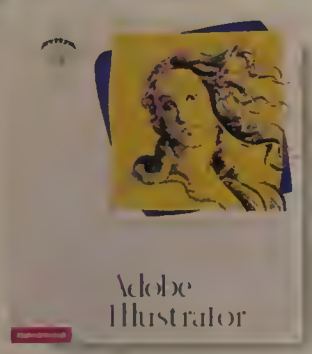
### Adobe PhotoShop




Start by scanning photos and textures, add paint effects, or create a montage. Then, combine your photos with *Adobe PhotoShop* and retouch and refine your images with advanced techniques like automatic trapping and color correction. You can even do your own color seperations. ..... **$499**

## Desktop Publishing
**CDA stocks all Adobe Fonts for immediate delivery — please call for our best price!**
Adobe Streamline V1.0 ..... $225
Adobe True Form ..... $225
Adobe Type Align ..... $59
Adobe Type Reunion ..... $38
Adobe Type Set 1 or 2 ..... $59
Adobe Type Set 3 ..... $69
Aldus PageMaker V4.0 ..... $499
Image Studio V1.5 by Letraset ..... $275
Publish it V2.0 by Timeworks ..... $225

### Adobe Illustrator 3.0 *w/ATM*




Now more powerful than ever with all new advanced text handling, graphing, blending capabilities, and presentation graphics options. Comes with Adobe Separator, ATM, Pantone Matching System, free technical support, an advanced tips and techniques guide, and a whole lot more! ..... **$279**

## Graphics / Design / Painting
Canvas V2.1 by Deneba ..... $179
Freehand V2.02 by Aldus ..... $329
PixelPaint Professional V1.0 by Supermac .... $389
SuperPaint V2.0 by Silicon Beach ..... $129
Swivel 3D V1.1 by Paracomp ..... $319
Ultra Paint V1.0 by Deneba ..... $119

## Multimedia
Director V2.0 by Macromind ..... $415
MediaTracks V1.0 by Farallon ..... $189
Sound Apprentice by Passport Designs ..... $189
SuperCard by Silicon Beach ..... $189

### Flash *by Beagle Brothers*

*Flash* is the fastest, friendliest file transfer program available. Quickly send files and messages to any other Mac, or group of Macs on your network. It even has a chat mode that lets you talk in real-time to anyone else. And, all file transfers are done in the background, so you never have to wait. ..... **$119**

## Networking
QuickMail V2.2 by CE Software (5 User) ..... $219
Traffic Watch by Farallon ..... $125
AppleShare FileServer V2.0 ..... $479
AppleShare Print Server ..... $219
Tops Network Bundle ..... $189

## Personal Finance
Dollars & Sense V4.1 by Monogram ..... $85
Managing Your Money V3.0 by Meca ..... $124
Quicken V1.5 by Intuit ..... $39

## Personal Publishing & Design
Design Your Own Home Series by Abracadata $69
Print Shop V1.31 by Broderbund ..... $35
Publish It Easy V1.1 by Timeworks ..... $113

## Planners and Organizers
Fast Track Schedule V1.5 by AEC ..... $139
For the Record V2.0 by Nolo Press ..... $32
Hyperworks Organizer by Timeworks ..... $62
Resume Kit by Spinnaker Software ..... $38
Will Maker V4.0 by Nolo Press ..... $35

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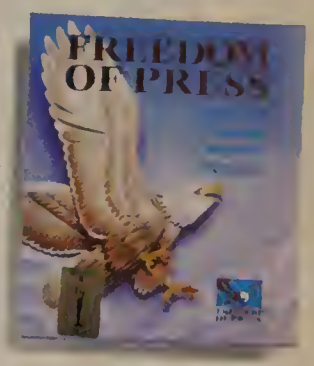


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# CDA Computer Sales

Circle 32 on reader service card

more compact format. When you need to access such files, you expand them back to their normal state. The best-known such utility is the excellent program StuffIt. But the shareware StuffIt is an application; so is its quicker new shareware rival, Compactor. Having to launch a program every time you need to compress or expand a file is so inconvenient that it's scarcely worth using for everyday work.

Thus, the stage is set for DiskDoubler, a slick little INIT that you drop into the System Folder to activate. It puts a new menu, labeled DD, on the Finder menu bar. Click on any file or folder, choose Compress from this menu, and DiskDoubler rapidly shrinks the file to roughly half its original size.

### How It Works

The beauty of this system is that you never have to launch a program to decompress a file. You can, if you want, select a file and choose Expand from the DD menu. But what makes DiskDoubler unique is that its compressed files behave exactly the same way that normal files do. You never have to expand a file before using it.

For example, double-click on a compressed Word file's icon. The file expands as Word is being launched, and the document opens normally. Or suppose you're in Excel and you need to open a spreadsheet you've compressed. Simply choose Open from the File menu in the normal way. All your Excel files, whether compressed or not, appear in the list box; you simply double-click on the one you want. DiskDoubler's compressed files expand automatically before appearing on the screen. You even have the option of recompressing files when you quit the program.

All of this automatic expansion and compression takes much of the headache out of file compression, and there are only a few circumstances in which the autoexpand feature doesn't work (PageMaker's Place command, selecting compressed files with OnCue, and low-memory situations).

About the only aspect of a compressed file that *isn't* like a normal file is the icon. A file that's been compressed with DiskDoubler displays a generic DiskDoubler icon. In the DD menu itself there's a File Info command that correctly identifies the file type, such as "Excel document." But by looking at its icon, you have no idea what kind of file it is.

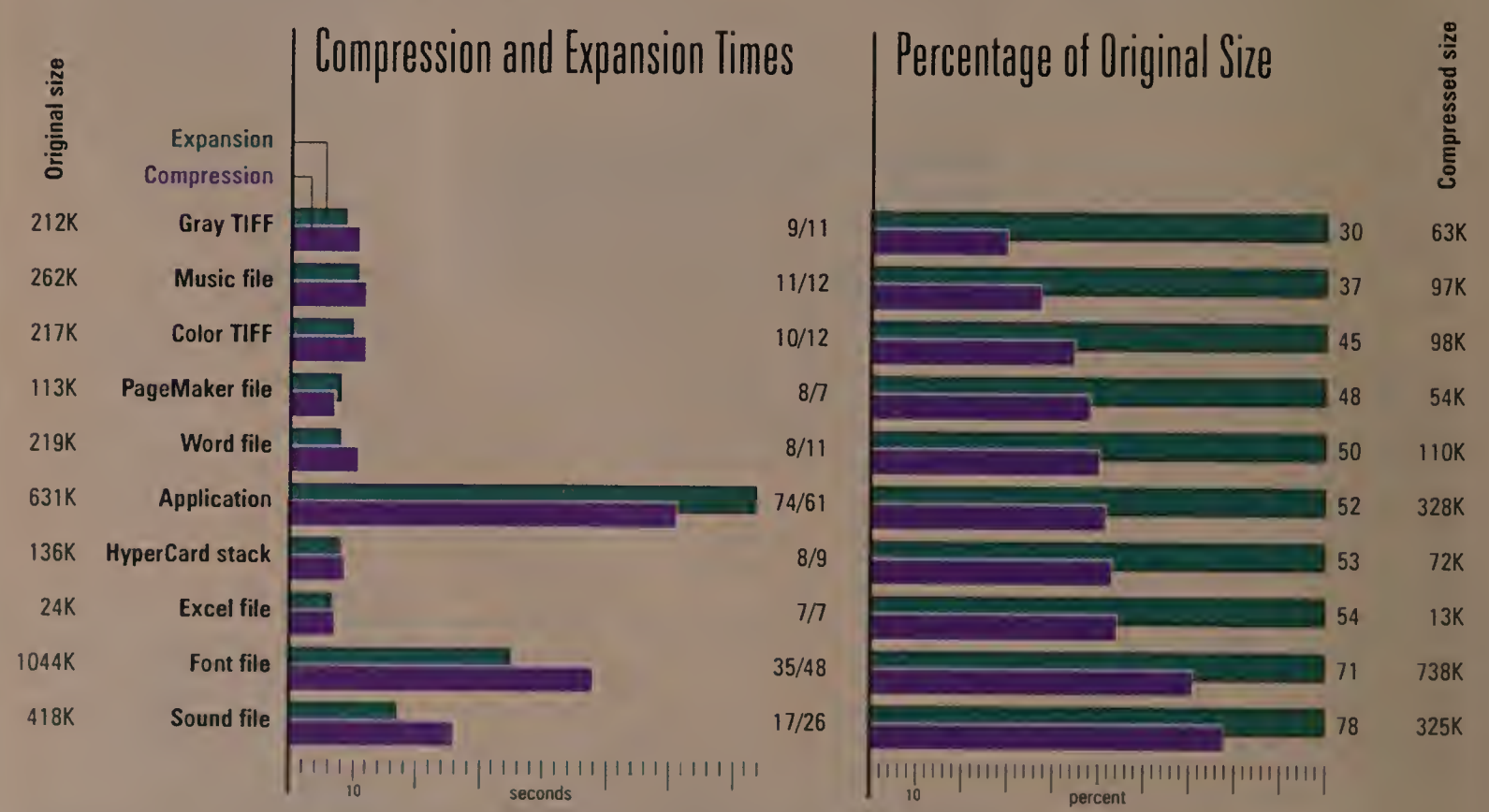
### How It Really Works

Compression programs operate on the assumption that any file contains some sort of repeated patterns: a graphics file might have a whole row of blue pixels, a memo contains some repetition of letter patterns, and so on. By coding this information, the file can be represented in a far smaller format ("4 blue" instead of "blue, blue, blue, blue").

Because of the different degrees of repetition contained within files, a file-compression utility's performance varies drastically. A TIFF graphics file containing lots of white space may

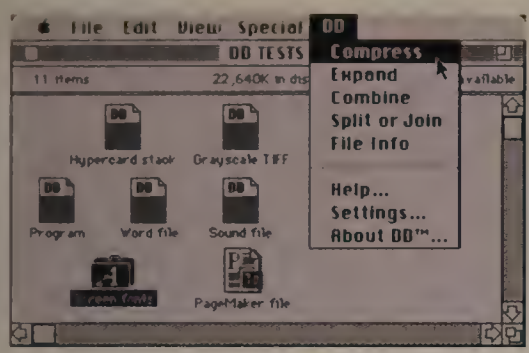
*(continues)*

## DiskDoubler Benchmarks




For these tests, DiskDoubler was left at its Best Guess setting. Some of these times would be faster, and compressions greater, if Method A or Method B had been explicitly selected, since Best Guess doesn't always make the best guess.

Tests were performed on a Macintosh IIcx with 5MB of RAM. Performance varies, depending on the Macintosh model; DiskDoubler's performance on a top-of-the-line IIfx is about five times faster than on a Mac Plus.




**Double-D Action** DiskDoubler's operation is refreshingly simple: click on a file and choose Compress from the DD menu. During the compression process, a Thermometer Bar dialog box appears, indicating how far the compression process has to go, and offering you a Stop button. When the compression is complete, the file you compressed still has the same name, but sports a generic DiskDoubler icon.

shrink down to 10 percent of its original size. A printer's font files, on the other hand, are already in an encoded format. Therefore they contain few patterns, and they may actually wind up larger than they were before being processed by a file-compression utility.

So how well does DiskDoubler work? A file-compression program should be judged by its speed, the degree of compression it achieves, and especially its safety. The last thing you want is to forever encode important data in an irrecoverable format.

DiskDoubler's speed and compression efficiency are both top-notch. In a battery of tests that I performed on Word, Excel, TIFF, sound, and other files ranging in size from 30K to over a megabyte, DiskDoubler took an average of 20 seconds for compression (see "DiskDoubler Benchmarks"). Expansion usually takes slightly longer. DiskDoubler's raw speed and size statistics look good even next to those of the commercially released StuffIt Deluxe 1.0, which has a similar Finder-level compression menu. In my comparison, DiskDoubler compressed files an average of 10 percent more than StuffIt Deluxe, and usually a few seconds faster.

DiskDoubler would take even less time, in fact, were it not for the INIT's safety features. First, it creates a compressed *duplicate* of the original file; only when it has successfully completed the compression does it delete the original. Therefore, the original file will always be intact if, say, the power goes out in midcompression. The second safety feature is *write verification*, whereby DiskDoubler rechecks every byte it has written to the disk. If there's any kind of hard-drive problem, such as a mote of dust on the disk surface or a SCSI-termination snafu, DiskDoubler refuses to proceed with the compression. This write-verification feature, which you can turn off, increases compression time by about 20 percent; but it's time well spent.

### First Compressions

DiskDoubler's interface and operation are blissfully simple. The Compress command shrinks one file, or all the files within a folder, individually. The Combine command compacts a group of files (within a single folder) into a single small file. The Expand command reverses either of the first two operations (see "Double-D Action").

DiskDoubler is not StuffIt, however (although it does decompress StuffIt archives). Specifically, DiskDoubler does not offer some of the features that StuffIt has that are useful to tele-communicators. You cannot extract a single file from a combined file, and you cannot combine files that reside in different folders. Nor will you find DiskDoubler-compressed files on most online services, where StuffIt archives are standard. And Disk-Doubler certainly doesn't have any of StuffIt's high-end features: passwords, a desk-accessory version, or foreign-file translators for IBM and UNIX files.

But DiskDoubler is designed to convert time into money. That is, if you're willing to wait 10 seconds here, 20 there, while DiskDoubler opens a file or a program you've compressed, you can easily reclaim double-digit megabytes of hard-disk space. All your files are still ready to go when you need them, and in the meantime, it's simpler and quicker to store them, back them up, and send them to friends over phone lines. Furthermore, DiskDoubler meets the highest standards of software design: it's quick, extremely easy to use, and very trustworthy. It's even inexpensive. For $80, you'll find no better bargain in data storage.—**David Pogue**

*See Where to Buy under "Santa's Spec Sheet."*

Music-Notation Program

## PYWARE MUSIC WRITER 1.1

**Pros:** Fast response during note entry, tool palette display, and screen redraw; ample selection of musical symbols; good MIDI support. **Cons:** Limited positioning of notes; lacks beaming across staves; inflexible tuplet system; often leaves stray marks on screen; bugs in group selection and beaming. **Company:** Pygraphics. **Requires:** Mac Plus. Hard drive recommended. **List price:** 40-staff version $595; 6-staff version $295; 3-staff version $119.

In a market for music-notation software already crowded with established programs of quality, newcomer Pyware Music Writer stands out only for the things it does wrong. While Music Writer produces a handsome piece of sheet music on a LaserWriter and offers a healthy array of MIDI (Musical Instrument Digital Interface) features, its otherwise stunted feature set and numerous quirks will confound and frustrate any serious composer or music copyist. Music Writer falls far short of comparably priced high-end programs such as Coda Music Software's Finale, Passport Designs' Encore, and Mark of the Unicorn's Professional Composer, and it can't even hold its own against the far less expensive Music Prose (Finale's low-priced version) or the best-selling Deluxe Music Construction Set (DMCS) from Electronic Arts.

### Symbols and Speed

Music Writer's strongest points are its wealth of musical symbols and its speed, both evident in a crisply responsive tool palette system. The program includes all the standard music-editing features, including beaming; control over stem direction, ties, slurs, and phrase marks; and note transposition. It prints gorgeous notation if you have Adobe's Sonata font, accepts MIDI input for fast note entry, and reads and writes MIDI files. Music Writer even has a few innovative touches that streamline the entry and editing of musical symbols; unfortu-

*(continues)*

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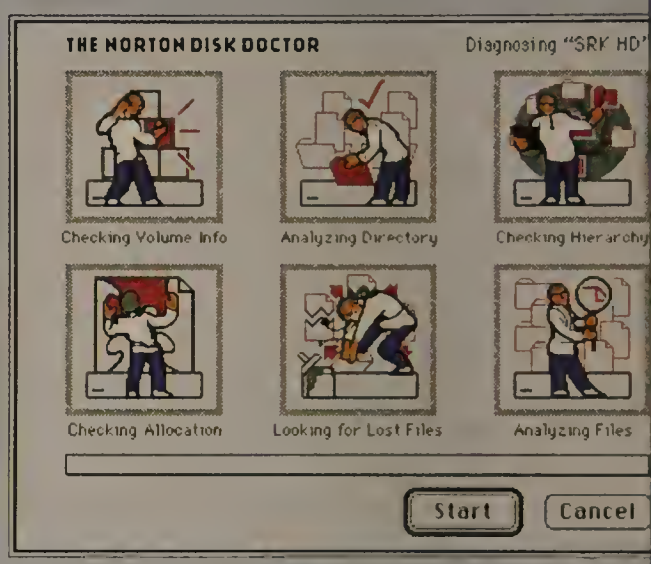


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Circle 141 on reader service card

nately, the program consistently falls down when it comes to the details.

Music Writer provides a uniquely easy way to move notes and other symbols around on your score as long as the score is relatively uncomplicated. You need only point at the symbol with the cursor—no clicking is necessary—and you're free to adjust its position precisely with the cursor keys. If you're pointing at a note, the up and down cursor keys move its pitch up and down.

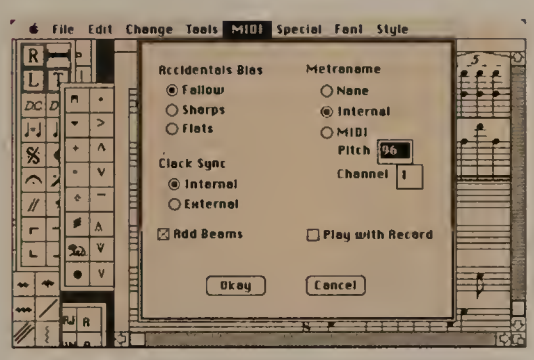
But three big problems mar this system. First, you're forced to use the keyboard to reposition symbols. Incredibly, you can't drag notes and other symbols from place to place; although you can explicitly select an individual symbol with the mouse, all you can do then is cut or copy the symbol, or if it's a note, alter its rhythmic value. Second, Music Writer offers no visual feedback to tell you which symbol you're pointing to. When several symbols are crowded together, the only way to tell which one the pointer is on is to see which one moves when you press a cursor key to reposition it.

Finally, the program places rather harsh limits on how far you can move a note horizontally—specifically, you can't move a note past the original position of the previous or subsequent notes. The ability to position symbols freely, exactly where you want them, is a key requirement for professional-level music-publishing software, and Music Writer fails in this regard. Even Deluxe Music Construction Set permits you to move notes anywhere you want them in a staff.

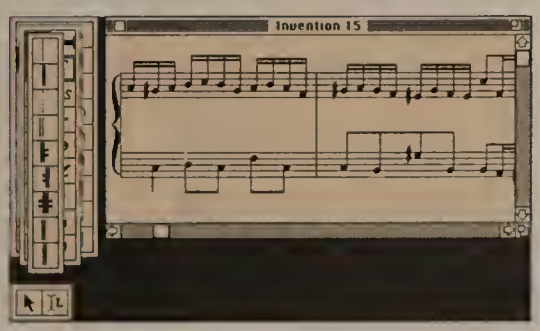
### Details, Details

Music Writer omits several other features that are critical for serious composers and music copyists. If you write on a grand staff for piano, for example, the program's inability to beam notes across staves will be unacceptable. On the other hand, the program seems to be targeted at composers of band and orchestral music, who may not notice this deficiency.

In addition, while Music Writer's somewhat unconventional system for entering tuplets handles common tuplet values comfortably, it breaks down when you get fancy. As in other high-end notation programs, you can specify both the number of tupled notes and the time in which the tupled notes should play. But with Music Writer's competition, you select the time value as the number of ordinary notes of the same rhythmic value as the tuplets. You might, for example, call for seven eighth-note tuplets in the time of four ordinary eighth notes. In Music Writer, on the other hand, you indicate the duration of a tuplet by selecting a single note value representing the total time of the tuplet figure. In this case, the septuplet would be seven eighth-note tuplets in the time of one half note. The problem with this method is that you're stuck with a limited number of possibilities, particularly since you can't use dotted-note values for the tuplet figure. In the Chopin Etude I tried to enter, several half measures include tuplets of five eighth notes against an underlying pulse of six. Six eighths last as long as a dotted half note, a value you can't use. You certainly aren't free to specify even more complex timings such as seven in the time of five.




**MIDI Transcription** MusicWriter can transcribe what you play on a MIDI keyboard into standard music notation. Among other options, this dialog lets you control the way the transcription handles sharps, flats, and notes with stem flags.




**Writing the Score** In Music Writer, the score you work on flows only horizontally, each staff stretching beyond the side of the window as far as necessary; in a score for piano like this one, much of the screen space is wasted. You can see how the staves will actually break on the printed page with a print preview command, but you can't edit the resulting page image. Note the stacked symbol palettes to the left of the score window.

Music Writer makes it very easy to create and place staves of all sorts in your musical manuscript. However, you aren't guided by any numeric reference point when positioning these staves; consequently there's no way to ensure uniform spacing between the staves unless you stick with the default staff placements.

Music Writer also requires two completely different techniques to delete ties and slurs. Most notation programs I've tried occasionally leave behind stray dots or lines on the screen after you've moved a symbol, but Music Writer commits this gaffe with annoying frequency. I spent a good deal of my time with the program using the Redraw command to remove the flotsam and jetsam; the one saving grace is that the program redraws very quickly.

### And a Few Bugs

My tests also uncorked several outright bugs in important program features. The function for selecting symbols in a group sometimes goes haywire. As you'd expect, you can drag across a region to select a group of symbols for cut-and-paste operations and the like. At times, however, Music Writer highlights the wrong sections of the score, and sometimes it simply fails to select any symbols at all. Glitches also occur in the beaming function. When I tried to beam a series of six 16th notes, Music Writer drew a malpositioned 8th-note beam to the last note in the group. Several attempts to correct the problem failed, and I had to delete the notes and start over.

If Pygraphics fills the most glaring gaps and flushes out the bugs, Music Writer would be a serviceable notation program, suitable for most everyday music-copying chores. Drop the list price of the 40-staff version by a few hundred dollars, and Music Writer's extensive symbol library would make it serious competition for DMCS (the lower-cost 3- and 6-staff Music Writer versions now available are too crippled to even consider). Against the expensive notation programs, however, Music Writer has a very long way to go.—**Steve Cummings**

*See* **Where to Buy** *or circle 807 on reader service card.*

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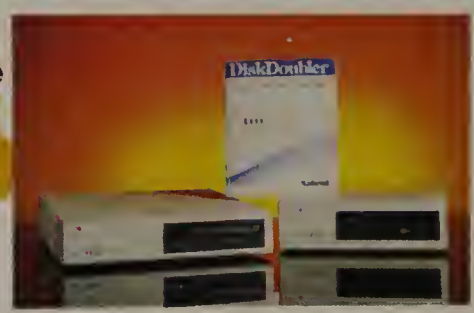


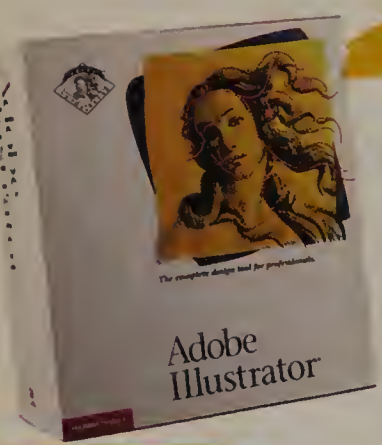


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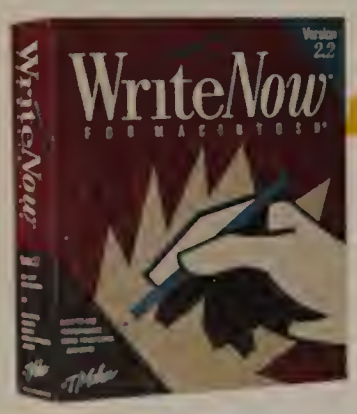


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PostScript-Compatible Laser Printer

# LASERSCRIPT

**Pros:** Compact; includes 3MB of memory; good LaserJet Series II emulation; good paper-handling features. **Cons:** Not as fast as other PostScript clones; can't use Type 1 downloadable fonts; output may be too dark for some tastes. **Company:** Abaton, a subsidiary of Everex Systems. **List price:** $2995.

MARK JOHANN

The LaserScript PostScript-compatible laser printer from Abaton

Timing is everything. Last year a $2995 PostScript-compatible printer with 3MB of memory would have attracted quite a bit of attention. But just this year, Apple introduced the $3299 Personal LaserWriter NT, GCC unveiled the $2299 Business LaserPrinter II (BLP II), Texas Instruments shipped the $2999 microLaser 35PS, and QMS launched the $2795 PS 410—all true Adobe PostScript printers, and all either good or downright superb values (see "Page Printers Revisited," *Macworld,* October 1990). In a matter of months, the low-end PostScript-printer market had exploded—and left very little room for the Abaton LaserScript.

The 35-pound LaserScript does have some desirable attributes. Its 300-dpi TEC 1305 engine prints 6 pages per minute (ppm) versus the 4-ppm pace of Apple's, GCC's, and QMS's low-end offerings. The LaserScript handles paper well, although its tray holds only 150 sheets versus the 200- or 250-sheet capacities of its competitors. Its print quality is excellent, although text may be a bit too dark for some tastes. And it's easy to set up—simply install a toner cartridge ($45; good for 1500 pages) and a drum unit ($150; good for 10,000 pages).

The LaserScript provides three connection ports: LocalTalk, RS-232C serial, and Centronics parallel. QMS's PS 410 also includes those three; GCC's BLP II and Apple's Personal LaserWriter NT omit the parallel port; and LocalTalk and serial ports are options on the TI microLaser. The LaserScript provides front-panel switches for switching between ports and between its PostScript- and Hewlett-Packard LaserJet Series II–emulation modes. A small front-panel liquid-crystal display shows the current operating mode as well as status messages.

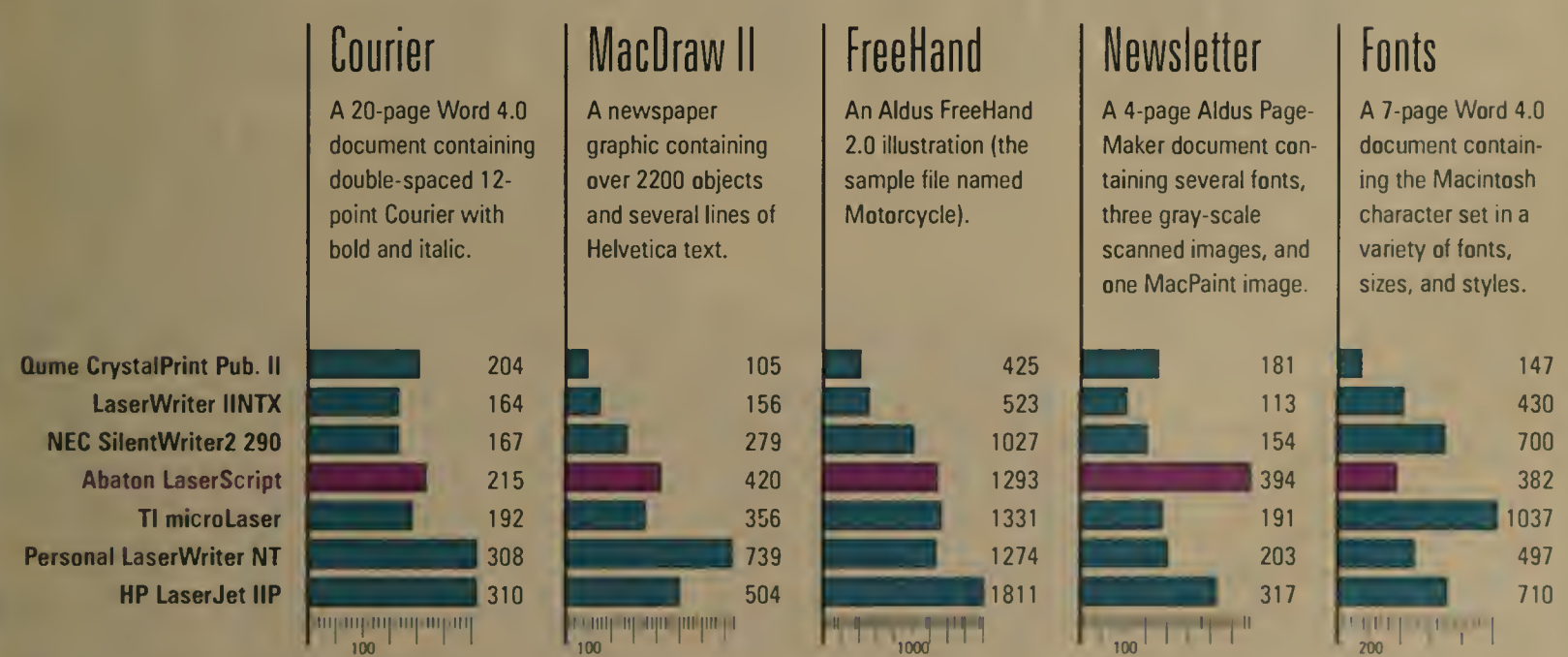
### Not So Fast

The LaserScript uses the PostScript interpreter developed by Microsoft and Bauer Technologies. The printer's controller uses a National Semiconductor NS32CG16 processor running at 15MHz. It provides 35 built-in fonts, the standard LaserWriter Plus mix. The fonts themselves were created by

*(continues)*

## ABATON LASERSCRIPT BENCHMARKS

All times are in seconds




The LaserScript was slightly faster than a LaserWriter IINTX in the fonts test, but slower in every other test. The LaserScript was particularly slow when processing scanned images and Aldus FreeHand drawings.

Tests were performed on a 2MB Macintosh II running MultiFinder with background printing disabled, using version 6.0 of the LaserWriter driver.

Bitstream, but their appearance and character widths match Adobe's. The printer provides two cartridge slots that accept Hewlett-Packard LaserJet–compatible font cartridges.

Companies that sell PostScript clones like to claim their wares are faster than Adobe PostScript printers, and Abaton is no exception. "Faster than the Apple LaserWriter IINTX," Abaton proclaims, but that isn't necessarily so. In my performance tests, the LaserScript was slightly faster than a LaserWriter IINTX when processing a typographically complex job, but considerably slower in every other test (see "Abaton LaserScript Benchmarks"). Indeed, in most tests the LaserScript was slower than a LaserWriter IINT, and in some it finished behind the Personal LaserWriter NT and the TI microLaser. And the LaserScript couldn't begin to approach the speed of another PostScript clone, Qume's CrystalPrint Publisher II.

The inability to use downloadable fonts stored in the Adobe Type 1 format is a more serious problem, one shared by the CrystalPrint Publisher. That means you can't use Adobe's top-notch library of downloadable fonts or any of the growing number of Type 1 fonts supplied by other vendors. Abaton says a new version of the controller will accept Type 1 fonts and should be available by the time you read this. An upgrade will be available for existing LaserScripts, but at this writing, Abaton had not determined its price.

### Not a Contender

The LaserScript includes an excellent manual with detailed instructions on using the printer with the Mac and with IBM PCs. It also includes a disk containing Apple's LaserWriter driver version 5.2—not the newer 6.0 driver, which provides better performance, support for more page sizes, and the ability to print halftones of color images. The LaserScript worked fine with the 6.0 driver in my tests.

In the end, the LaserScript just isn't a contender among low-end PostScript printers. Its mediocre performance, smaller paper capacity, and inability to use Type 1 fonts can't offset its fine print quality and 6-ppm engine. Perhaps the new, Type 1–compatible interpreter will offer better performance. Until it becomes available, however, the low-end offerings from Apple, Texas Instruments, GCC, and QMS are better choices.

**—Jim Heid**

*See* **Where to Buy** *or circle 760 on reader service card.*

Gantt Chart–Creation Software

## GREAT GANTT 1.2

**Pros:** Creates customized Gantt charts from templates or from scratch; imports MacProject files. **Cons:** Needs MacProject file to effectively manage a large project; calendars don't adjust for task durations that include a weekend. **Company:** Varcon Systems. **Requires:** Mac 512K. **List price:** $195.

Great Gantt lets you create or improve the appearance of Gantt charts, diagrams that use horizontal bars to show how long various tasks in a project will take to complete. The bars' beginning and endpoints correspond to calendar dates along a chart's horizontal axis, and the length of a bar represents the duration of a task. Bars are stacked according to the order in which the tasks will be performed, and the time marked by the start of the first stacked bar and the end of the last stacked bar is the length of time the project will take.

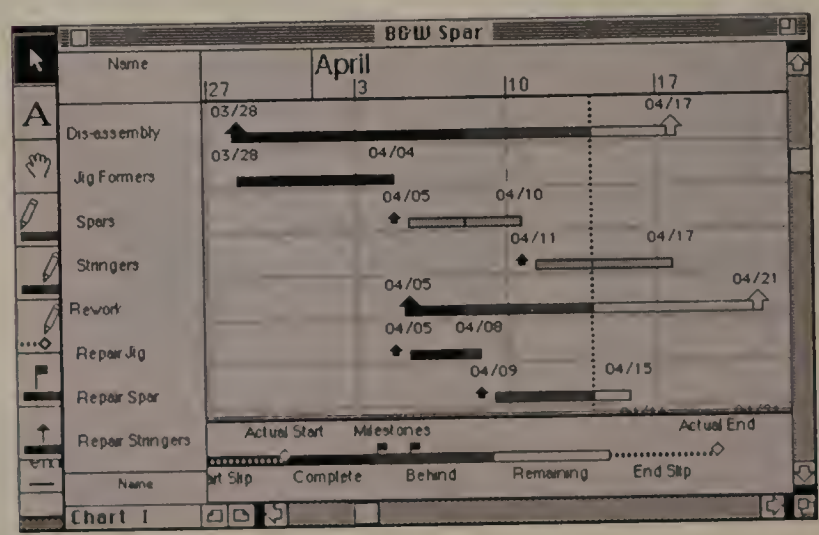
People who use a Macintosh to manage projects typically rely on project-scheduling programs like MacProject to help them get the job done. Such programs offer sophisticated features such as automatic task dependency and resource-management functions; but the reports from those programs, especially the Gantt charts, are plain and often difficult to understand. Using Great Gantt you can can open MacProject files directly, and import specially formatted files from other Macintosh project-management software, to make great-looking Gantt charts that are simple to understand.

### Status Report

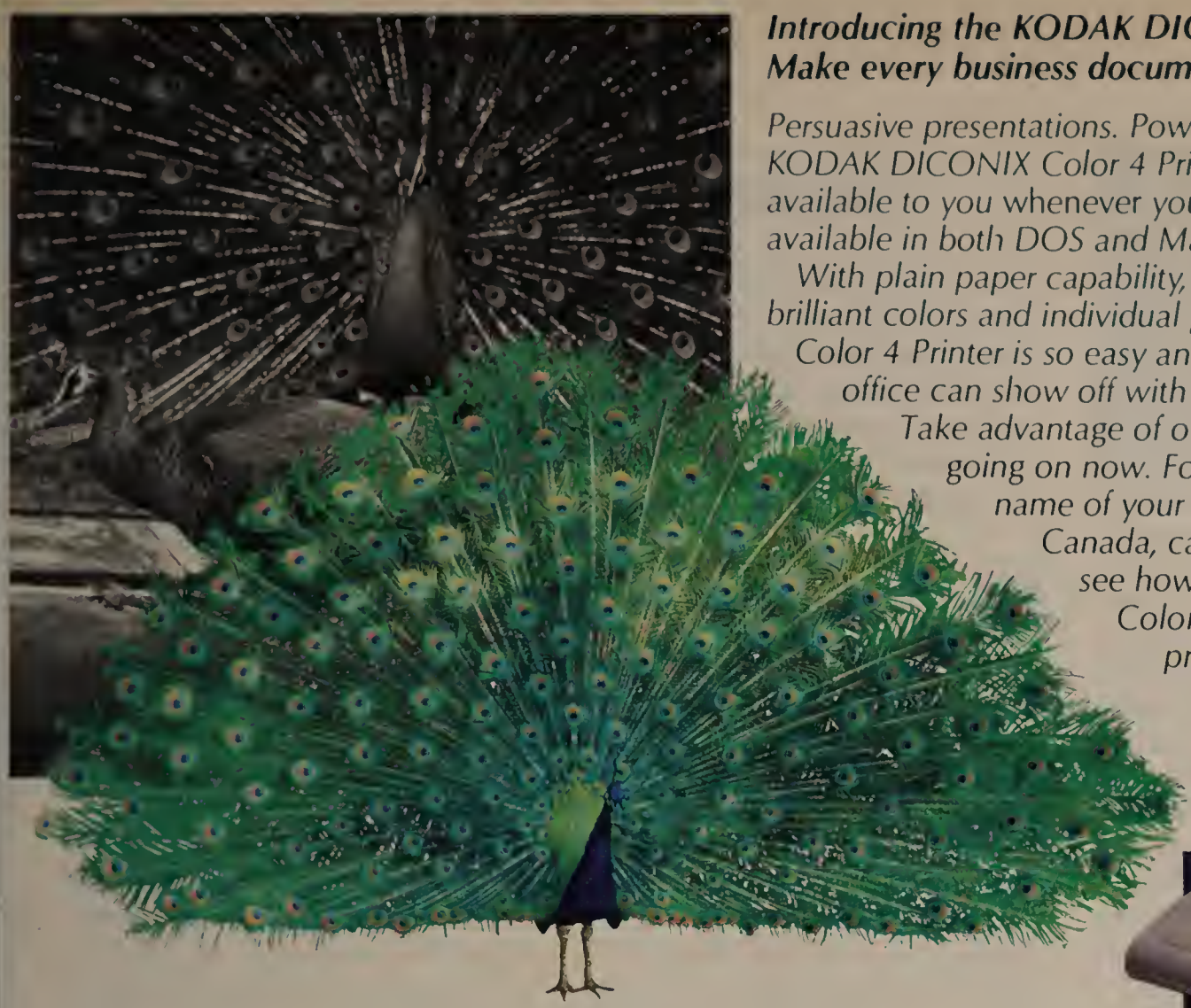
The status of an entire project can be immediately clear in a well-drawn Gantt chart. It's easy to tell which tasks have been completed, which ones are underway, how close a task is to completion, and what tasks remain to be started. With Great Gantt you can make each of these task conditions look different. A completed task could be represented by a solid bar, and a task that hasn't been started could be represented by a clear bar. You can use fill patterns and shading to convey additional information about the status of a task; a delayed task might be shaded, for example, and a task that is 50 percent completed might be 50 percent solid and 50 percent clear. If you don't like those fill patterns, you can choose your own.

You could create such a chart in a draw program, but Great Gantt does more than just draw and shade bars. It also shows task start dates, finish dates, and durations, as well as the current or progress date (the date that represents actual progress for each task). The program displays the name of each task on either the right or left side of the chart, or on both sides. You can make an adjustment to a task by moving one or both ends of its bar, and the program recalculates the project dates in a box that includes the planned and actual start and finish

*(continues)*




**Building a Better Jig** With Great Gantt you can show task dependencies, as well as their status. A program-generated legend explains all the task-bar status symbols.



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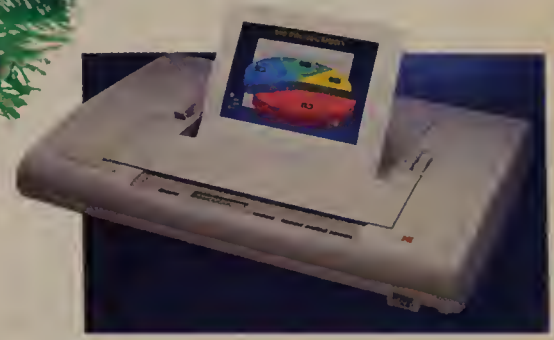

KODAK DICONIX COLOR 4 PRINTER

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dates. Unfortunately, Great Gantt doesn't adjust for weekends. If a project is scheduled to begin on Monday, April 5, and end on Friday, April 9, for example, and you change the start date to Wednesday, April 7, the program doesn't add extra days to adjust the end date—it shows Sunday as the completion date of the task.

Great Gantt includes a tool for creating tasks, a tool for recording the progress of each task, and a tool for placing milestones (which represent important events). Another tool lets you show the relationship between tasks if one can't be started until another has been finished. This dependency is shown by arrows pointing to the preceding tasks (see "Building a Better Jig"). The slippage tool is used to show the amount of time between when an event was scheduled to happen and when it actually was undertaken.

### Finishing Touches

Great Gantt also has tools that help you put the finishing touches on a chart. You can add your own graphics, and you can place extra columns on the left or right side of the chart to show dates, costs, or other essential parameters of your project. The program will also create a legend explaining all the symbols in the chart. You can display two calendars on a chart, one at the top and one at the bottom. You also can add a header, a footer, or both to further explain the chart. A title block that shows the schedule name, your name, and the date the schedule was printed helps give your chart that professional touch.

The manual includes a good tutorial and detailed descriptions of all menu selections. The descriptions include informative sections that tell you when and why you would want to use a command and how to use it.

### Small-Scale Projects

If you manage projects with less than 20 or 30 individual tasks (and so don't need automatic resource leveling or other such features), or if you use Gantt charts as a vehicle to explain your projects to others, Great Gantt may just make your job easier.

**—Brooks Hunt**

*See Where to Buy or circle 744 on reader service card.*

Arcade Game

## SKY SHADOW 1.0.2

**Pros:** Fun sounds; colorful graphics; highly addictive. **Cons:** Severe penalties for minor mistakes; often crashes under Multi-Finder. **Company:** Casady & Greene. **Requires:** Mac Plus. **List price:** Version 1.06 $49.95.

Sky Shadow is a colorful arcade-style shoot-'em-up game from the creator of Crystal Quest—Patrick Buckland. Your mission is to evade or shoot various alien spacecraft as they shoot back and try to ram you. At the same time, you bomb the alien surface installations while trying hard not to hit the few remaining pockets of friendly natives.

To succeed, you have to master bombing the enemy and landing on the one hospitable airstrip. Bonus points are based on bombing accuracy and on the difficulty of the bombing run. Your guns are increased to a maximum of three, based on your score after each landing.

The game starts off fairly slowly with only a few aliens, but after one time around the landscape, things start to heat up. Once your score reaches 100,000 you go into MegaMode, which is about twice as fast and can lead to some hefty bonuses if your bombing accuracy is close to 100 percent. Naturally the speed makes it harder to land on the short landing strip.

There is a way around the landing problem. As you fly along you run across little icons that give you such goodies as smart bombs (which kill all enemies and wipe out obstacles), automatic landing capability, instant repair of all damage, automatic continuous gun firing, higher-scoring bombs, bonus points, and, everyone's party favorite, invulnerability.

**Invulnerability Ahead** Fleeing its enemies (left), Sky Shadow is about to grab an invulnerability blob. (Note: background shown here has been altered.)

### HyperSpace

Once you learn to land and you get all the guns and neat equipment, you'll find that your score goes up until suddenly you are in HyperSpace, where things really speed up and the invulnerability icons become necessary to your continued existence.

Unfortunately, steering is all up and down, and though you can slow down and speed up some, you can't turn around. You have to catch those invulnerabilities or die. You can end up staring at the right-hand edge of the screen, hoping for invulnerability icons, which are unfortunately hard to see. Eyestrain is a definite possibility, so it helps to pause the game once in a while and rest your eyes.

Sky Shadow is basically a fun game with Buckland's usual neat and funny array of sounds and graphics. It does have two basic flaws, however. Oddly enough, the first is that you can save the game at any time. This means you can save the game in midflight, as soon as you pick up an invulnerability token. Scores in the billions are possible, but so is boredom. To keep the suspense in the game at the higher levels, it might have been better to allow players to save the game only after a landing.

The second flaw is that you must try *very* hard to avoid bombing, shooting, or crashing into friendly towns. If you do hit one, you are penalized all the points you scored with the current ship, which can be millions. The penalties would be fair except that sometimes several bandits can hit you at once and knock out the retro rockets. If you make even a small downward adjustment to try to avoid the bandits, you can lose control and crash into a friendly city, wiping out the entire score for that ship. Warning: Severe rage may occur. I'd like it better if the penalty were less severe, perhaps only a mere million or so.

All in all, though, Sky Shadow is an engaging, fun, and highly addictive game—just what you expect from the instigator of Crystal Quest.**—Tom Moran**

*See Where to Buy or circle 816 on reader service card.*

Skiing Simulation Game

## MACSKI 1.0

**Pros:** Wide variety of courses and scoring modes; easy-to-use course editor; humorous sound effects and graphics. **Cons:** Jumpy animation on cluttered courses; minor bugs. **Requires:** Mac Plus; 2MB RAM for color. **Company:** XOR Corporation. **List price:** $69.95.

MacSki is designed to simulate that special excitement of flying down a powdered slope, racing past all obstacles, with perfect coordination. But before you even open the box, two simple precautions could quickly change your status on the slopes from novice to hot dog. First, turn your mouse over and give the rollers and ball a good cleaning. Using an unresponsive mouse on the MacSki slopes is comparable to showing up for the Olympics sporting a pair of cheap rentals. Second, clear off your desk and give yourself plenty of elbowroom to maneuver the mouse. The courses in the MacSki package are some of the hairiest imaginable, often requiring sharp cuts with little forewarning. It would be a shame to eat snow on a crowded slope just because your coffee mug got in the way.

The initial MacSki interface is an après-ski scene enticingly called Brew's Ski Lodge. Bedecked with a flashing neon arrow, the lodge serves as a central menu of self-explanatory icons that enable you to choose different types of skis, change weather conditions, check up on the competition, and open new courses. Clicking on the snowbanks surrounding the lodge starts you at the top of the currently loaded course. There are 23 courses included with the game, as well as an easy-to-use Course Editor that allows you to create your own run, or modify an existing one.

### The Clock Is Running

The game's seemingly simple objective is to get from the top to the bottom in as little time as possible. Clicking the mouse button starts the timer, and each subsequent click gives the poles a push, rapidly increasing your speed until you are in a full tuck position. Running over a stopwatch freezes the timer for a few seconds, and hitting a cake of wax increases your speed dramatically. Moving the mouse to the left or right turns the skier with varying degrees of responsiveness, depending on the size and flexibility of your skis, your speed, and current weather conditions. The Other menu offers you the opportunity to control the skier with custom keystrokes. Unfortunately, because of a bug that has since been corrected but was mistakenly left on the initial release, I couldn't use this option.

### Gunning for Frosty

The courses vary in degree of difficulty and grade of slope, and some offer standard competition layouts such as giant slalom and downhill, where you must ski around single gates—alternating on the left and right sides—or through pairs of flags. Missing a prescribed turn invokes a penalty, adding time to your overall score. Other runs have less conventional scoring methods, for example penguin scoring (definitely not for the animal rights activist). You must run over every bird on the slopes (they give out a nasty little squawk when you flatten them), and your time increases for each one that you miss. Snowman scoring is very similar, and perhaps a little more humane.

Despite MacSki's apparent simplicity, my first couple of runs down the powder of Algorithmia (the default course rated at the easiest level) were a real disaster. Obstacles on this course are numerous and randomly placed, ranging from rabbits and boulders to cameramen and igloos. Hitting one of these hazards at high speed can result in wipeouts reminiscent of the "Wide World of Sports" "agony of defeat" footage.

### A Wild Ride

I chose a firm, standard-length pair of skis and ended up with a little more than I could handle. As you increase a ski's length and firmness, you gain speed but sacrifice turning ability. I quickly realized that my choice had not been a prudent one as I zigzagged down the course, squashing a squirrel here and straddling a pine tree there. Perhaps the most humiliating collision

**A Skier's Best Friend** Unfortunate skiers who are prone to wipeouts are encouraged to finish the course by a bewildered, but amiable, Saint Bernard with a brandy cask around his neck.

I took was smack into the behind of a Lycra-clad ski bunny, who feebly lifted her head from the snow and yelled in a nasal voice, "Bean brain!"

Each time I took a fall, I somersaulted through the air and landed with a loud groan. To recover from a fall, you must click the mouse repeatedly until the skier gets back on his feet. You can also set the game to do the clicking for you. The amount of time it takes you to stand again depends on how fast you were going when you fell, how quickly you can click a mouse button, and on how many previous spills you have taken on the run. If you are extremely prone to wipeouts, eventually a bewildered-looking Saint Bernard will plod across the course to renew your spirit with a few pulls from the cask around its neck. When you cross the finish line, the crowd lets out a cheer of approval and you are given your rank among the top five times for the course.

### Breaking Records

The graphics and sound effects in this game are original and entertaining, and with a little practice I quickly found myself flying down the slopes like a pro. The program crashes occasionally in color mode, but returns you to the Finder rather than crashing the whole system. I also enjoyed designing my own courses and challenging friends to top my records. Each course saves a top-five list, noting any inclement weather. Split times and the difference between your score and record times are given as you race, and the real challenge of the game lies in trying to break long-standing records.

**—Evan Cooper**

*See Where to Buy or circle 778 on reader service card*

Document-Conversion Utility

# WORD FOR WORD MAC 1.2

**Pros:** Makes conversions to and from Mac and MS-DOS document formats fast and easy; expandable. **Cons:** Doesn't always retain format of translated documents; Mac-to-PC transfers not explained; conversion codes not defined; PC Excel not labeled as such; limited number of converters. **Company:** Developed by Mastersoft; published by The Software Toolworks. **Requires:** Mac Plus. **List price:** $149.95.

Word for Word Mac is a utility that can convert documents into 6 Macintosh and 26 PC text formats. You can copy to disk only those converters you are likely to use, or copy all of them, which takes up 1421K of disk space.

Most of the time you will probably be transferring data between word processors, although Word for Word Mac also includes features for converting information from page-layout applications and PC Excel and Lotus 1-2-3 spreadsheets for use in Macintosh or IBM PC word processors. Conversions can also be made to and from a variety of formats: Mac-to-Mac, Mac-to-PC, PC-to-Mac, and even PC-to-PC.

### Document-to-Document Conversions

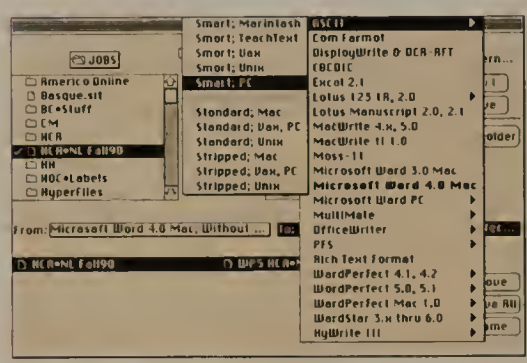
Converting a document is simple. First, you double-click on a source file. Next, you select a target format and a location. Clicking on the Convert button opens a window with two calibrated thermometers (red and green on color monitors), which track the progress of the conversion.

Word for Word Mac automatically names the converted file using a combination of the original file name and an abbreviation based on the target format type. For example, an Excel file named Excel Test and converted for use in Microsoft Word 4.0 would be named MW4 Excel Test. An option allows the name of the converted document to either remain the same as the original or have the target format abbreviation placed after the name.

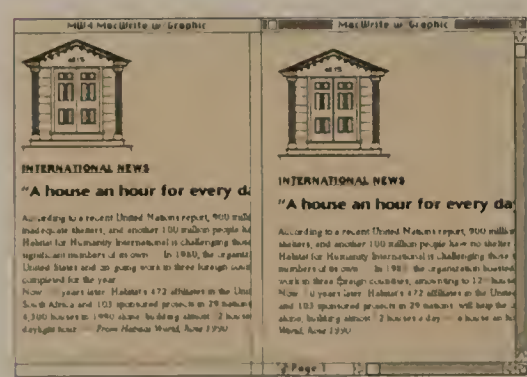
### Almost Faithfully Converted

MacWrite and Microsoft Word documents containing graphics can also be translated (see "Picture Perfect"). When I tried this, the graphic was converted, along with the point size and styling of three typefaces. I was impressed. I also achieved similar success in preserving formatting characteristics when transmitting a Mac Microsoft Word file to the PC version of WordPerfect.

A conversion from a Mac Excel file to a Mac Word file was only partially successful, however. All the information arrived on the other side and was fully editable, but some of the columns needed realigning. I later discovered that the Excel file converter referred to in the Word for Word Mac list is in fact the PC Excel file converter, though it is not identified as such. I also learned that proportional fonts may cause misalignment of translated columns. A nonproportional font (like Courier) translates more smoothly. It would be nice if all of these potential glitches were mentioned in the manual. By the time you read this, however, The Software Toolworks should be shipping a new version of Word for Word Mac that clears up the confusion over the Excel translation and supports graphic transfer to Macintosh WordPerfect.




**Convertible Mac** Here I've chosen to transfer a Microsoft Word 4.0 file, without graphics, to a PC ASCII format by selecting both the source and destination formats from hierarchical pop-up menus.




**Picture Perfect** As you can see from this screen, both text and graphics transferred accurately from MacWrite II version 1.0 (right) to Microsoft Word 4.0 (left).

### Conversion Limitations

Retaining formatting features of converted documents is one of Word for Word Mac's most valuable features. But despite claims that the program translates all formatting and page-layout features, the manual admits that Word for Word Mac can't do this in all cases, and the program contains options for reporting items within a document it can't translate.

The bottom line is that some items just don't translate in Word for Word Mac; the program embeds a 3-letter conversion code in the translated document or produces a separate document containing a list of non-converted items.

Some of the codes used are easy enough to understand. For example, *<ITO>* stands for *italics on* and *<ITF>* for *italics off*, indicating that the text between the two codes should be italicized. Others are more cryptic and sent me back to pre-Mac days when I saw similar inscrutabilities upon documents created with my Kaypro 2X. I mean, what does *header/footer discontinuance (<HFD>)* mean? Or *rest hyphenation zone (hotzone) (<RHZ>)*? The manual lists all of these codes but does not define them. In my opinion, the next edition should.

Something else that should find a place in the next edition of the manual is a simple discussion about cross-platform transfers. For PC-to-Macintosh conversions, the program assumes that the source document has already been transferred. Some users will certainly be confused when they insert a PC disk into a Mac expecting Word for Word Mac to work wonders and are asked (by the Macintosh Operating System) if they wish to initialize the disk. The files must first be made Mac-ready by a trip through Apple File Exchange before Word for Word Mac can begin its work. These shortcomings are disturbing, and they distract from what is otherwise a fine and very welcome product.

**—Philip Bishop**

*See* **Where to Buy** *or circle 838 on reader service card.*

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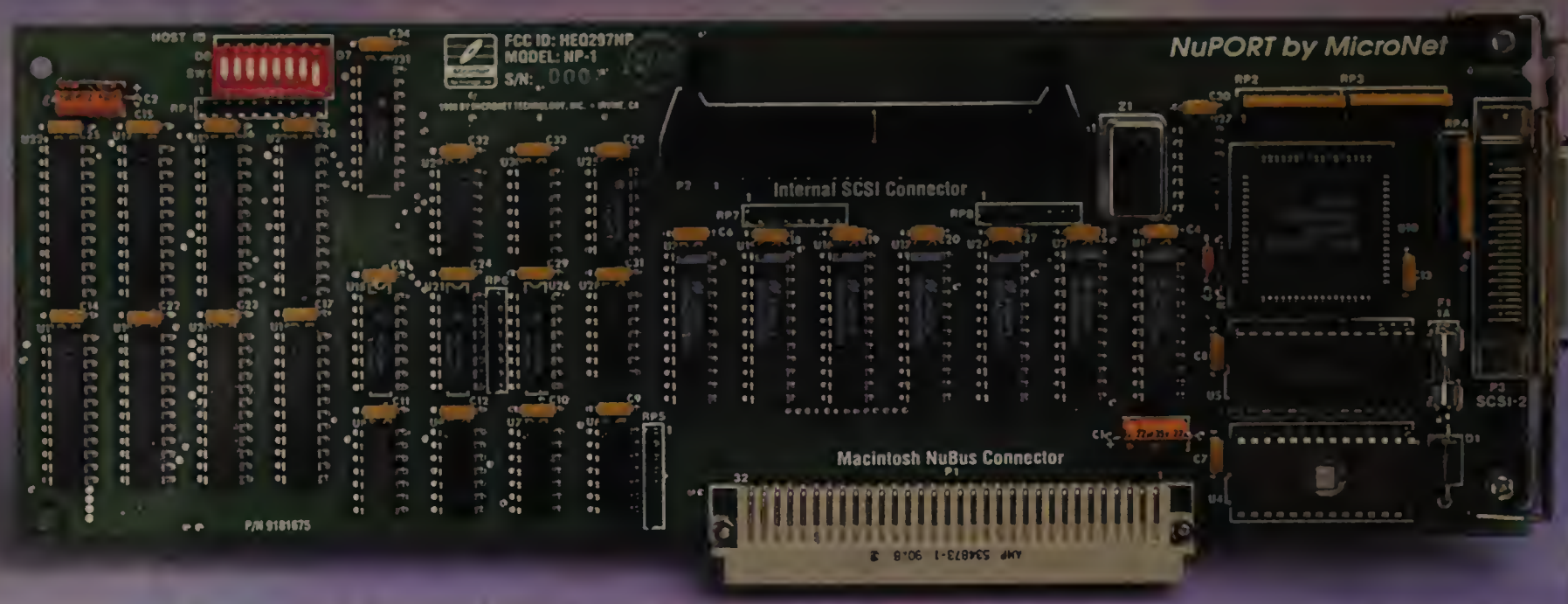


# 3.7 MBytes Per Second System. MicroNet's SCSI NuPORT™ Delivers!

Finally there is NuPORT. A NuBus, SCSI-2, synchronous, DMA, host adapter, that is fully compatible with the Macintosh II family.

Each NuPORT host adapter adds a brand new SCSI port that is three times as fast as the native SCSI port. To ensure performance, MicroNet sells matched hard disk drives capable of synchronous transfers from 2.1 to 3.7 MBytes per second. Their capacities range from 300 to 2,000 MBytes with average access time as fast as 5.4 ms.

Matched NuPORT hard disk drive systems are excellent for all disk intensive applications. They are especially suited for sound, graphics, multi-media, publishing, pre-press, CAD/CAM, and EtherTalk file servers.

For more information and the location of an Authorized MicroNet Reseller in your area, call our sales department at 1-714-837-6033.

## COMPARISON OF SIMILAR PRODUCTS

| | NuPORT | PowerCard | ProntoCard |
|---|---|---|---|
| Time to Duplicate 200 MBytes | 3:39 | 9:30 | 9:58 |
| Time to Load a 30 MB Color File | 0:11 | 0:33 | 0:37 |
| Suggested Retail Price | *$600 | $1295 | $1495 |
| True NuBus Bootable Device | Yes | No | No |
| Disables Built-in SCSI Port | No | Yes | Yes |
| Multiple Macintosh Support | Yes | No | No |
| Supports SCSI-2 and 16 Bit SCSI | Yes | No | No |
| Synchronous Data Transfers | Yes | No | No |
| Supports Transfers to 4.4 MBytes/s | Yes | No | No |
| Includes Hard Disk Utility Software | Yes | No | No |
| On-Board DMA Support | Yes | Yes | No |
| Shipped With a Matched Hard Disk | Yes | No | No |
| System 7.0 Compatible | Yes | Yes | Yes |
| A/UX 2.0 Hard Disk Partitioning | Yes | No | No |
| Supports Spliced/Overlapped Seeks | Yes | No | No |
| Supports Synchronized Spindles | Yes | No | No |

**NuPORT is Sold Only With Matched Hard Disk Drives.**

*Additional cost when added with specific MicroNet hard disk subsystems.

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# WINDOW SHOPPING

by Lawrence Stevens

*This month I look at four programs that help with your typing, writing, researching, and mailing tasks. I also introduce a computer buddy.*

RON CHAN

**Magic Typist 1.1 (formerly Clairvoyant 1.1)**

Word processors have grown up since the early eighties when I first started using a computer. My typewriter-laden friends used to go gaga over the software's ability to delete, copy, and insert (which was about all it could do). Now many people consider word processors that lack glossaries, style sheets, and page-layout functions to be hopelessly inadequate.

But no matter how sophisticated these packages are, none has eliminated the need to use the keyboard. Enter Magic Typist ($99 from Tactic Software), a program designed to help lighten your typing load by automatically completing some words after you type the first few letters.

To set up Magic Typist, you have to build a vocabulary of your most-used words. You specify the length of the words you want Magic Typist to learn and then have it "watch" as you type with any word processing or text editing software. Any words at or over the length you specify are automatically added to Magic Typist's vocabulary. Later you can edit the vocabulary, eliminating words you don't want. You also set the length of each word's root: the first few letters of each word that, when typed, cause Magic Typist to complete the word.

Let's say you want Magic Typist to learn all words that contain seven or more letters and you set the root length to four letters. The next time you type the word *computer*, the program adds that word to its vocabulary, designating the first four letters, or *comp* as the root.

From that point on, whenever you type *comp*, a dialog box appears that contains a numbered list of all the words in Magic Typist's vocabulary that begin with those four letters. For example, the box might display *1. comparison, 2. complicate, 3. computer,* and *4. computerize.* You type in the number that corresponds to your choice, and the program completes the word for you.

I'm a fast hunt-and-peck typist, so by the time the dialog box appears and I select the word I want, type the number, and wait for the program to type the remaining letters, I could have typed the word myself and be 20 words further along.

There are, however, two ways in which Magic Typist might come in handy. The first is that it can type entire blocks of text including tabs and paragraphs. For example, you can have it enter an entire letter heading whenever you type your name.

The second way involves the program's ability to replace unique abbreviations with a complete word or phrase. Magic Typist makes you go through a somewhat involved process to set this up but, for example, you can have the program type *computer* whenever you type *cpt* or *message* whenever you type *msg*. This approach might be good for anyone suffering from carpal tunnel syndrome. The advantage is that you don't have to use the dialog box.

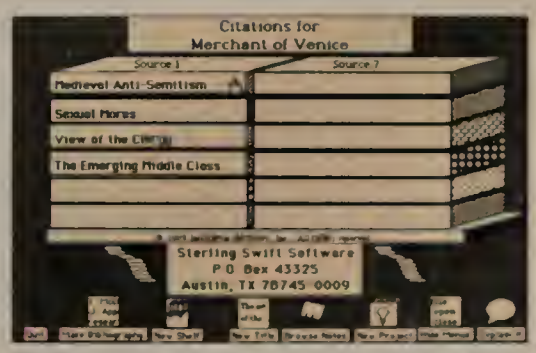
The program is relatively fast. So if your typing tasks are taking too long, and you are willing to learn some new tricks, this is for you.

**SwiftNotes 1.0**

For most people, the biggest problem is not how to type but what to type. As a teacher, I find that many students have problems taking notes and incorporating them into their papers. Either they take very skimpy notes and then compose their papers using whatever information they happen to have collected, or they take voluminous notes but have no adequate way of organizing them.

SwiftNotes, a $44.95 HyperCard stack from Sterling Swift Software, helps you enter and organize research notes. It virtually forces you to maintain complete references for each note, organizes the notes by topic, and provides a means of pasting the relevant

*(continues)*




**Viewing Your Notes** All notes are accessed from this screen. You set up a different bookshelf for each project. Each book is automatically labeled with the title of one note; clicking on a book spine takes you to the complete note; clicking on an empty book spine takes you to a blank note card.

parts of each note into a word processor document almost automatically.

To create a new note card, you click on a button (see "Viewing Your Notes"), and a series of data entry and dialog boxes lead you through entering all the needed information, including author and publisher, page numbers, and one or more keywords.

When you're ready to write your paper, you select a keyword, and the program displays, one at a time, all the cards with that keyword. As each card appears, a dialog box asks if you want to gather notes from that card. If you click on yes, you simply highlight the text you want. After you have gone through all the cards, SwiftNotes can launch your word processor, open your research document, and paste in all the highlighted notes.

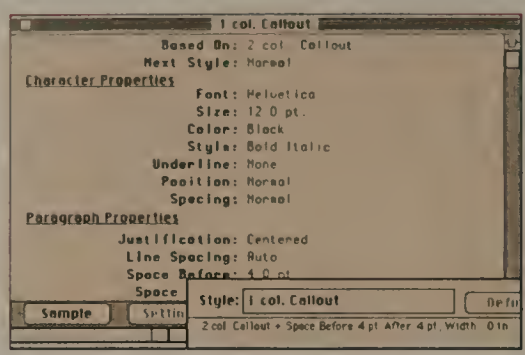
The software is aimed at the high-school market, but it could be equally valuable to college freshmen or sophomores. The big advantage for anyone unfamiliar with note taking is that SwiftNotes holds your hand every step of the way. Personal Reference Catalog (from Delphinus), a similar program that I reviewed in October, accepts data in a single screen, where you tab from field to field. SwiftNotes, on the other hand, has a host of messages, dialog boxes, and data entry boxes that offer the one-step-at-a-time approach that many students need.

However, for advanced students, or adults, there are disadvantages to this structured approach. For one thing, data entry is slow because you have to click your way through all the boxes. Another disadvantage is that it's hard to get back to a previous dialog box to make a change.

For these reasons, I recommend that experienced researchers buy Personal Reference Catalog. Not only does it make input easier but it also offers more citation formats. For students who are just getting started, however, SwiftNotes provides the necessary structure.

### Stylist 1.0

Most people are able to save time by establishing a standard structure for their documents. To facilitate this, Microsoft Word allows you to save style sheets that automatically format text.




**Microsoft Word Style Sheets Explained** Stylist gives you detailed information about Microsoft Word 4.0 style sheets. By clicking on the Sample button, you can view a sample of the style. The insert shows how Microsoft Word describes the same style

The problem with Word's style sheet feature is that it describes each style by referring to the style on which it is based. So, to learn all the attributes of a particular style, you have to look at, and combine in your mind, two or more styles.

Stylist ($79.95 from SNA) makes it easier to understand styles by listing all the attributes of a style on one sheet (see "Microsoft Word Style Sheets Explained") and by providing sample text in that style. If you use style sheets often, Stylist can save some confusion. If your workday is anything like mine, confusion is one thing you don't need.

### MacLabelPro 1.0

Creating mailing labels and envelopes is an unpopular task. My guess is that there is more software for creating mailing labels and envelopes than for doing anything else. But MacLabelPro ($99.95 from Avery Commercial Products Division) deserves attention.

First of all, the MacLabelPro label-template menu uses Avery product numbers rather than sizes. This saves you from having to wait while a harried clerk at the office-products store looks up the number of the label you need.

**Graphical Control** MacLabelPro gives you a great deal of control over the look of each label. Text and graphics can be resized, redrawn, rotated, even nudged up or down. Most functions are accomplished through the tool palette on the left side of the screen.

Second, MacLabelPro's graphics functions rival even some of the early Mac drawing programs. It has all the standard drawing tools (rectangle, oval, and so on), it includes a snap-to grid (called a Magnet), it rotates images, and it even lets you specify the round-corner diameter. The program can also import PICT and EPS images or grab an icon.

The final advantage of MacLabelPro is that it imports tab-delineated, comma-delineated (BASIC), or SYLK files. Most of the label-and-envelope packages I've seen import only one of those formats.

The only disadvantage of using MacLabelPro is that you can't enter or store a data file such as a mailing list. You have to use MacLabelPro with a spreadsheet, database manager, or other application that exports one of the formats that MacLabelPro accepts.

### Talking Moose 3.0

Before closing, I'd like to introduce you to Talking Moose ($39.95 from Baseline Publishing).

This small animated moose appears on screen and teases you in Macintalk when you perform certain functions or when the Mac is inactive. For example, when you copy, it might ask: "Are you sure that's worth copying?" Or after a pause in activity it might ask you to "Turn on the modem. I want to make a long-distance moose call."

Talking Moose has a large repertoire of phrases that it chooses randomly, and you can add or delete phrases. It even translates normal spelling into Macintalk phonetics.

The jokes are witty, the animation is cute, and the sound is as good as can be expected. How long you use this utility depends partly on how long you can listen to the Mac's voice. I had some fun for the first few days, but now it is usually turned off. Still, it's nice to know that if I ever get really lonely, I have a ready companion living in my Mac. ◻

*See Where to Buy or circle 775 (MacLabelPro), 779 (Magic Typist), 825 (SwiftNotes), 827 (Talking Moose) on reader service card.*

# NOW THAT 10GB FITS ON AN 8MM TAPE, WHAT ARE YOU WAITING FOR?

You don't need to wait hours to change tapes.

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It's the digital CY-8200, now with optional data compression. And you can get it exclusively from Contemporary Cybernetics Group.

With data compression, the CY-8200 can quadruple the amount of data you can load on an 8mm cassette that fits neatly in your shirt pocket. Meaning the already tremendous savings in man hours, media costs, storage and shipping are multiplied by four.

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| Arix | DEC Unibus | Novell | Sequent |
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Of course, the data compression feature is switch-selectable, so you can turn off data compression to read and write standard 8mm tapes.

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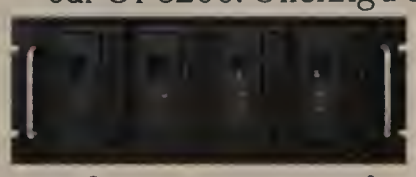

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EMAC has found a way to prevent unnecessary Macintosh hard drive fatalities with SCSI Sentry,™

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Metros are zero-footprint disk drives – so they fit perfectly under a Mac Plus or SE. You can also stand Metro on its side next to any Mac II, keeping your desk free for papers, phones, or photographs.

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When you add the SCSI Sentry to such reliable disk drives, you know your data's safe with Metro. If you want to own a disk drive with a bulletproof vest, call EMAC at *1-800-821-0806, extension 2222, (In Canada, 1-800-663-5161).*

EMAC

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# NEW PRODUCTS

**Edited by Mary Margaret Lewis**

This section covers Macintosh products formally announced but not yet evaluated by Macworld. All prices are suggested retail. Please call vendors for information on availability.

## HARDWARE

### Building-to-Building Photolink

System that uses infrared light to link computers in one building to others operating in an adjacent building. Available in AppleTalk-LocalTalk for Mac networking environments, and RS-232 interface for terminal-to-host applications. Mounts to window glass or wall near window for users to connect desktop computers in an office building or temporary trailer to computers operating in another structure up to 600 feet away. $3990 per connection for AppleTalk-LocalTalk product. Photonics, 408/370-3033.

**Building-to-Building Photolink**

### CrystalPrint Page Printer

PostScript-compatible page-printer that provides RISC-based processing of the original CrystalPrint Publisher, adds Adobe Type 1 font compatibility, supports the Mac's smoothing functions, has expandable RAM, and manual sheet and envelope feed. $3995. Qume, 408/942-4000.

**CrystalPrint Page Printer**

### EtherWorks SCSI and EtherWorks II

EtherWorks SCSI connects via the computer's SCSI port, is fully compatible with AppleTalk software, and can be used with the Mac Plus and the Portable. EtherWorks II is a NuBus board designed for Mac compatibility. Supports 32-bit data transfers and has thick and thin Ethernet interfaces to allow connection to thin Ethernet RG-58 coax cable or attachment to an external transceiver used to connect to thick Ethernet. EtherWorks SCSI $499, EtherWorks II $399. Technology Works, 512/794-8533.

### Extended VGA Monitor

14-inch, high-resolution color monitor that automatically scans all horizontal frequencies from 30kHz to 37kHz and all vertical frequencies between 50Hz and 90Hz, to ensure compatibility with most analog IBM PC, and compatible, display standards and to accommodate new standards. $899. Packard Bell, 818/773-4400.

### MacPortable Adapter

Adapter that enables the video signal from the Macintosh Portable to be used for nView projection systems. $189. nView Corporation, 804/873-1354.

**MacPortable Adapter**

### R45 Plus

44MB removable-cartridge drive that comes with a two-year warranty on the drive mechanism and a one-year warranty on the cartridge. Runs self-test diagnostics. $1399. Rodime Systems, 407/994-5585.

**R45 Plus**

### ScuzzyGraph

External video board that plugs in to the SCSI port. Provides screen sizes up to 425 percent larger than the Mac Portable's LCD display with resolutions up to 1280 by 1024 pixels. Has been tested with a variety of color monitors and can be used with any color monitor with a minimum of 640 by 480 pixels that is capable of accepting digital or analog signals. $895. Aura Systems, 619/438-7730.

### Silentwriter2 Model 90

Six-pages-per-minute laser printer compatible with both the Macintosh and MS-DOS machines. Designed for use as a standalone PostScript printer. Provides 2MB of RAM, is expandable to 4MB, and features a Motorola 68000 microprocessor with a built-in 16.7MHz Adobe PostScript interpreter. $2495. NEC Technologies, 508/264-8000.

**Silentwriter2 Model 90**

### Static RAM Board

3MB static RAM board for the Mac Portable that increases the Portable's memory to 4MB for memory-intensive applications. Uses true low-power high-speed static RAM for minimal current draw, and occupies the RAM expansion slot in the machine. $355.

*(continues)*

Static RAM Board

Lifetime Memory Products, 714/969-2421.

### SuperMatch

Color matching system to ensure color fidelity between Mac graphics monitors, scanners, and output devices. Allows Mac color graphics users to precisely match spot color and continuous-tone color images on displays and input/output devices. $695. SuperMac, 408/245-2202.

### T1200 DAT Drive

1.3-gigabyte digital audiotape drive that provides unattended backups, and

T1200 DAT Drive

ships with SoftBackUp network-backup software. Users can preprogram system to back up entire disk or volume, or specific files only. Designed on industry standard DDS recording format. $2997. Mirror Technologies, 612/633-4450.

### TelePort

Portable modem that connects to the ADB. Unit fits in the palm of your hand, mounts on a wall or the side of a desk, and draws its power from the Mac. Uses MNP Class 5 data compression to guarantee error-free communication at rates of up to 4800 bps, and complies with Bell 103, 212, 212A, and the V.22 and V.22bis standards. $149.95. Global Village Communication, 415/329-0700.

### Typist

300-dpi hand-held scanner with 5-inch scan width. Scans 2 inches per second and inputs directly into application. Device uses Caere's AnyFont technology, scans horizontally or vertically, stitches automatically, and has automatic contrast settings. Comes with image-capture software. $695. Caere Corporation, 408/395-7000.

Typist

### Video Explorer

Macintosh board that enables the user to digitally combine live video sources, computer graphics, and computer animation in real time. Includes special effects such as fades, wipes, dissolves, keying on chrominance and luminance signals, and antialiased titles and graphics. Under $10,000. Intelligent Resources, 708/705-9388.

### VLF Monochrome and Grayscale Monitors

Versions of Sigma's 15-inch PageView, 19-inch L-View, and 21-inch Silver-View monitors that meet new standards for extremely-low-frequency emissions expected to be set in Sweden next year. $1499 to $3199, depending on model. Sigma Designs, 415/770-0100.


# HP offers you the best things nex

From input to output, Hewlett-Packard leads the way. With a full line of Macintosh-compatible printer and scanner choices.

For photographic-quality scanning, there's the HP ScanJet Plus scanner. Combine that with one of HP's high-quality printers. The DeskWriter, the LaserJet III, the LaserJet IIP, or the LaserJet IIID. HP even has color printers. The PaintJet and the PaintWriter XL.

Plus, HP stands behind all their products with exceptional service and support. And a one year warranty. It doesn't get much better than that.

There is a better way.

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## SOFTWARE

### BannerMania
Software for creating banners. Bends and shapes text and reduces jaggies. Comes with 50 ready-made banners, 34 special effects, 27 shapes, 19 fonts. Compatible with Adobe Type 1 fonts. 1MB min. memory. $59.95. Brøderbund Software, 415/492-3200.

### ClickChange
Utility for personalizing Mac's look-and-feel by customizing buttons, scroll bars, windows, and colors. Cursors can be colorized, animated, and zoom-edited, and beep sounds changed. 1MB min. memory. $79.95. Dubl-Click Software, 818/700-9525.

### CommLink/Plus
Newspaper-publishing software that connects, via communications ports, most newspaper publishing systems with the Mac. Enables newspapers to move text to the Mac for pagination or other processing, and to translate standard typesetting formats to QuarkXPress style tags. 1MB min. memory. $695. Baseview Products, 313/426-5751.

### Darwin's Dilemma
Color strategy game loosely based on the theories of evolution. Player moves through levels of the game by colliding and merging icons that represent increasingly complex life forms. Each level involves new creatures and a puzzle to solve. Varying levels of difficulty and limitless situations keep the game play fresh. 512K min. memory. $49.95. Inline Design, 203/364-0063.

Darwin's Dilemma

### DataPrism
Mac front-end query tool for SQL databases that can access the Oracle database server and all servers supported by Apple's Data Access Language. Provides full query capabilities without requiring extensive knowledge of SQL. 1MB min. memory. $435. Brio Technology, 415/961-4110.

### DesignCAD
CAD program describes geometry by means of a single, mathematical parametric representation. Uses unified mathematics to ensure consistency and accuracy, concurrently allowing wire-frame, surface, and solid-geometry integration within a single environment. 1MB min. memory. $699. DesignCAD, 918/825-4848.

DesignCAD

### DNA Parrot DP 100
Software that enables molecular biologists to enter data about DNA sequences into a Mac database from an autoradiograph of a DNA sequencing gel. The program produces audio and visual feedback so a sequence, once entered,

*(continues)*

to your Macintosh.

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can be confirmed, and the user can control the reading without looking at the screen. 1MB min. memory. $749. T&T Research, 416/252-4789.

### Docu-Mentor

Electronic notepad that helps organize personal information such as lists, notes, outlines, names, numbers, and appointments. Allows free-form input of text and contains a menu-driven retrieval system. 1MB min. memory. $100. 3-Soft Company, 319/337-8903.

### EasyServer

Stand-alone file server that comes configured for LocalTalk and a SCSI port, and that can communicate with CD ROMs, removable drives, WORM drives, or any Mac-compatible storage device that can be shared on a network. AppleShare-compatible with full support for file sharing and multiuser databases. Ethernet and token ring options available. 1MB min. memory. $1995. ShirtPocket Software, 602/966-7667.

### EndNote Plus

Bibliographic software that conducts one-step Boolean searches; supports sorting, printing from within the application, and searching for duplicate records; contains QuickFind feature; and has a system designed to handle different standards of journal abbreviations. 512KE min. memory. $249. Niles and Associates, 415/655-6666.

### ESR

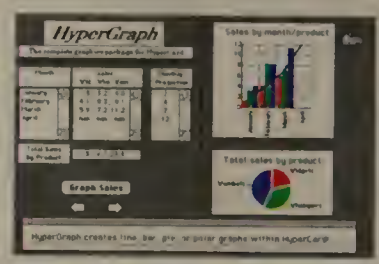
Anisotropic electron-spin-resonance program enables the user to simulate both powder and solution ESR spectra. Supports all naturally occurring isotopes for the first 103 elements, and permits the user to define line shape, number of integration steps in the solid-angle surface integration, nuclear abundances, spectrometer frequency, line width, spectral width, and spectral resolution. Can simulate up to 24 nuclear spin sets. 512KE min. memory. $225 for 512KE or later Mac; $295 for other versions. Calleo Scientific Software Publishers, 303/493-8573.

### Financial Learning System

Interactive self-study program that incorporates a computer-based business emulation to provide an understanding of financial terminology, financial reports, profitability, cash flow, asset management, financing instruments, and asset valuation. Combines a four-part workbook, case studies, exercises, and review questions. 512K min. memory. $299.95. Strategic Management Group, 215/387-4000, 800/445-7089.

### HyperGraph

Utility for HyperCard that lets users add charts and graphs to stacks. Has options to control graph size and limits, axis and grid types, and axis and graph labels. Uses numeric data and an option list as input for creating a graph. 1MB min. memory. $79. Boojum Computer Systems, 301/989-9708.




**HyperGraph**


# With the HP LaserJet III, you can

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**HyperSnoop**
HyperCard programmer's tool that can be used to examine any stack and to produce and store a listing and analysis for all or any parts of the stack. 1MB min. memory. $28. Superior Process Engineering, 619/752-5843.

**InfoDesk Series**
Software-based reference packages that include the electronic edition of The Random House Encyclopedia and Inside Information. Users can swap reference databases from within the program being used. 1MB min. memory. $119. Microlytics, 716/248-9150.

**ithink**
Visual-thinking tool designed to improve people's ability to understand the way complex organizations and the processes operating within them work. Graphical interface enables the user to define the underlying interdependent relationships in a business, through building animated models that show fluctuations, surges, and declines defined by various types of plots available in the Graph Pad. 1MB min. memory. $450. High Performance Systems, 603/543-9636.

**MacDialog Editor**
Developer's tool for creating interfaces for Macintosh-based Prolog applications. The editor enables programmers to draw dialog boxes on the screen; generates the necessary Prolog code to implement the dialog boxes, which can be pasted into a MacProlog application. 1MB min. memory. $325. Quintus Computer Systems, 415/965-7700.

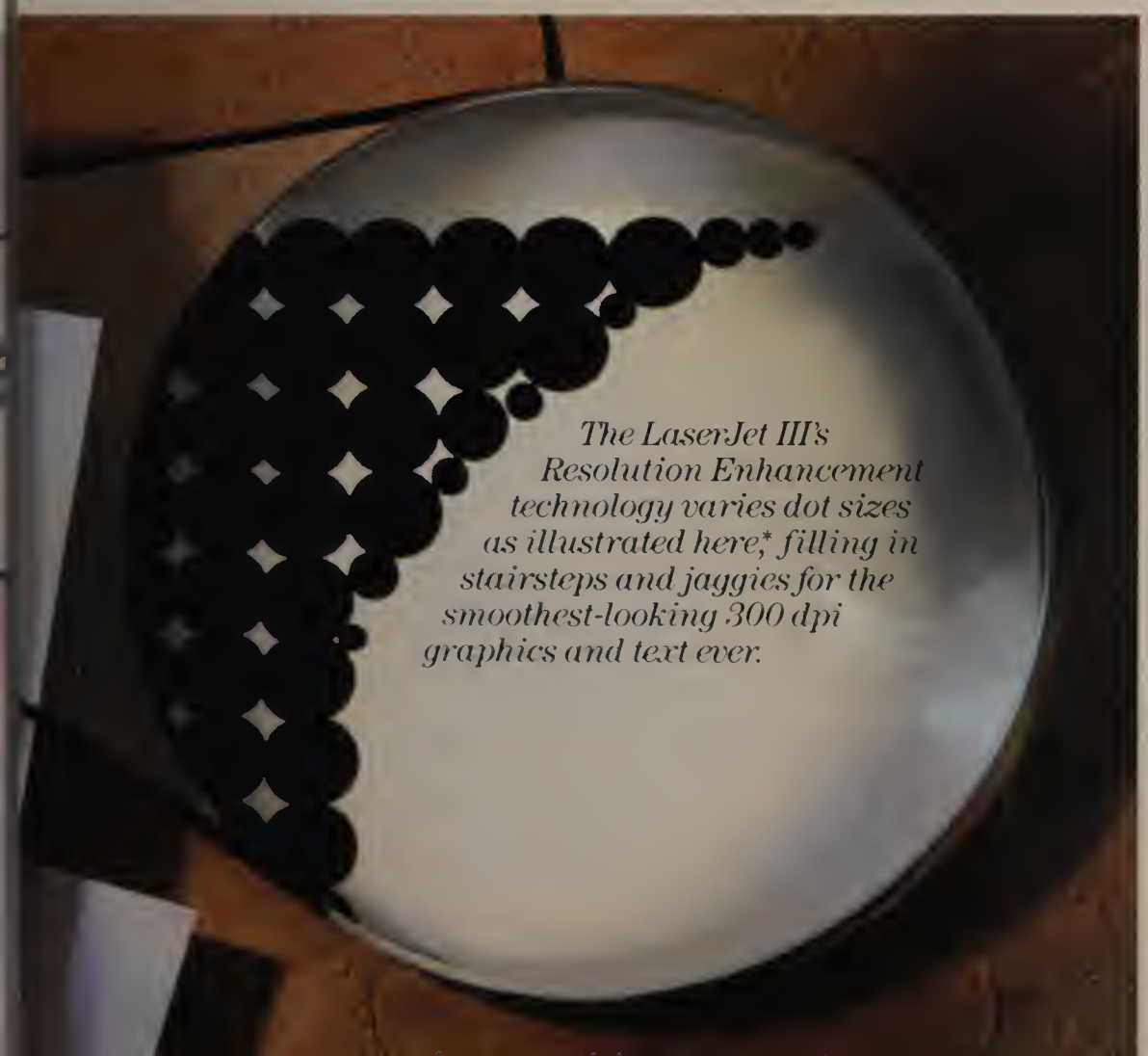
**Macintosh Foot-Inch Calculator**
Foot-and-inch calculator program that makes a scrolling, printable tape of operations. Has functions to perform conversions, brick coursing, areas, slope, and circumference calculations. 1MB min. memory. $21. CALC, 1841 Columbia Rd. NW, #203, Washington, DC 20009.

**MacLabelPro**
Label-publishing software that merges existing files with graphics and text elements to produce labels for mailing and other applications. Provides a tool palette with more than 20 items for creating, editing, and manipulating design objects, and comes with a library of clip art designed for the program. 1MB min. memory. $99.95. Avery, 818/915-3851.

MacLabelPro

**MacRoad DTM**
Interactive application for the geometric design of roads on the Mac. Incorporates terrain modeling and contouring features. Creates a terrain model using a triangulation of survey points in which the user can enter feature strings and change the triangulation on the screen to ensure that the natural surface is correctly modeled. Draws smooth contours at any interval. 1MB min. memory. $4000. Vector System/MicroConcepts, 219/478-8088.
*(continues)*


# refine your characters.




The HP LaserJet III printer delivers the most refined 300 dpi print quality ever. And it's easy to use. When configured with Adobe® PostScript® and AppleTalk interface, the LaserJet III is completely compatible with your Macintosh. All for only $3,700†.

HP offers other Macintosh compatible LaserJets. The new LaserJet IIID printer with increased paper-handling capability for $5,125†. And the affordable LaserJet IIP printer for only $2,595†. Call **1-800-752-0900, Ext. 1168** for the name of your nearest authorized HP dealer and ask for the Macintosh versions of the LaserJet line.

There is a better way.

HEWLETT PACKARD

### MapInfo for Macintosh

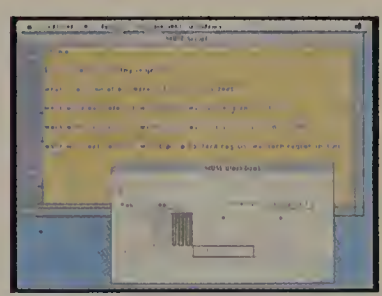
Desktop-mapping product that has built-in relational-database engine with SQL querying capabilities. Provides graphical and visual representations of geographic data and provides two levels of querying for nontechnical and for advanced users. Results can be viewed in mapping, graphical, and browse modes. 1MB min. memory. $695. MapInfo, 518/274-8673, 800/327-8627.

### The Mathematics Teacher's Workstation

Educational software for math teachers who teach junior high, high school, and college mathematics courses. Teachers can use drawing tools to design geometric constructions; display text; and graph rectangular, polar, or parametric coordinates. Graphics from other applications may be imported. 1MB min. memory. $149.95. Sterling Swift Software, 512/280-2431.

### Muse

Language-driven data-analysis software that is designed to convert raw data into finished analysis using a natural-language command interface. Enables users to simultaneously reference, manipulate, reformat, calculate, and visualize large data sets. Imports data in a variety of forms and familiar formats, and organizes data as it is imported into the program's WorkBooks. 2MB min. memory. $695. Occam Research, 617/923-3545.



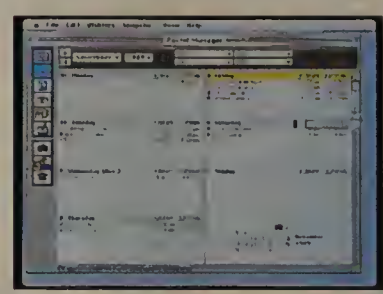
Muse

### MusiCard Maker

HyperCard stack for developing music flash cards. Can produce three different sizes of staves and corresponding symbols; a variety of clefs including treble, tenor, viola, bass, and grand Staff. Has the ability to notate fingerings or bowings and comes with an interactive owner's-manual stack that contains notating shortcuts. Print option lets you produce cards in a number of sizes or formats for different uses. 2MB min. memory. $49.95. LittleNote Software, 408/978-0473.

### Pastel Manager

Personal information–management tool designed to organize and integrate addresses, notes, tasks for the day, and other bits of personal information. Information is stored in units labeled items, such as Calendar Item and Note Item, which are stored in single, flat files. Users can view the information in one of six modes: search, edit, desktop, month, week, or day. 1MB min. memory. $295. Pastel Development Corporation, 212/431-3421.



Pastel Manager

### PerfectPairs

Six packages of automatically prekerned screen fonts for use with Aldus

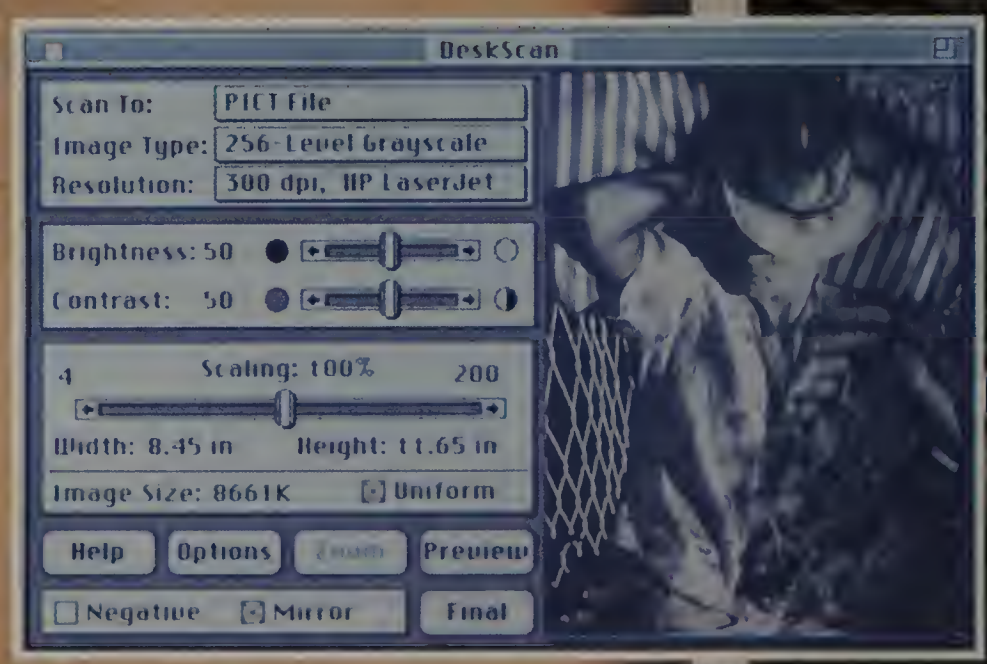

# With the HP ScanJet Plus, you've

**The HP ScanJet Plus scanner provides 8-bit photographic-quality scanning.**

That means 256 shades of gray for the hottest-looking output from your Mac. And it's so easy, too. At the click of a mouse, you can get negative or mirror images, as well as scaling in 1% increments from 4-200%. All for $2,190,* about what you would expect to pay for a 4-bit scanner.

So if you want the richest, most detailed images from your Mac, you've got it made with Hewlett-Packard. Call **1-800-752-0900, Ext. 1005** for your authorized HP dealer.

There is a better way.



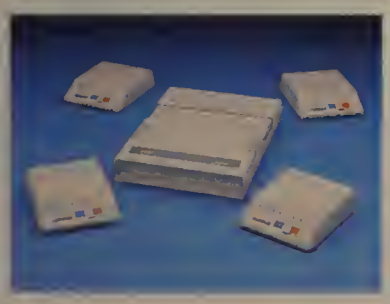

For all its amenities, ease of use, good image quality, and low price, *Publish!* recommends the HP ScanJet Plus as their "Best Buy."

HEWLETT PACKARD

PageMaker 4.0 and Aldus FreeHand. Fonts work automatically and use PostScript printer fonts. 1MB min. memory. $24.95 per package plus $2 s/h. PerfectPairs, 206/822-4010, 800/544-9543.

### P/Net

Peripheral-sharing device that can be used on Mac, IBM PC and compatibles, and mixed-platform networks. Device is operating-system independent. Enables you to share printers, modems, and other RS 232 or standard parallel connections. 1MB min. memory. $1695. Practical Peripherals, 818/706-0333.



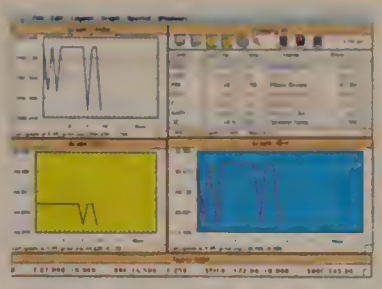
P/Net

### Quotemaster Plus/Mac

Literary-quote retrieval system. Simplifies process of finding literary quotations; lets you access material with a hierarchical-search module, or by entering any combination of subject, author, or time period. Contains over 3000 quotes on 800 topics by 950 authors. Expandable with additional databases of quotations on humor, success, motivation, as well as contemporary quotes. 1MB min. memory. Basic system $89; each additional database $25. PennComp, 713/669-0965.

### QuoteMaster Real Time Stock Monitoring System

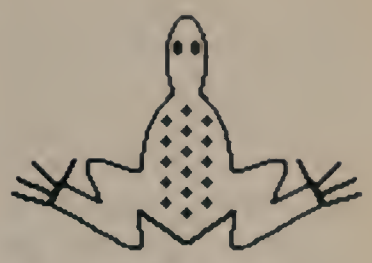
Real-time stock market–monitoring system that uses satellite-based receivers. System has complete background monitoring of all securities, can run 24 hours a day to monitor up to 1250 securities, and is MultiFinder-compatible. Automatically retrieves and displays headline news. 1MB min. memory. $395. Strategic Planning Systems, 800/488-5898.



QuoteMaster Stock Monitoring

### The Santa Fe Collection

Clip art collection of more than 600 Native American and Southwest images and 140 borders on eight 800K floppy disks. Illustrations are stored in bitmapped format for use in almost all paint, draw, text processing, or page-layout applications. Comes bundled with Artisto+ desk accessory that enables users to copy and paste collection images into documents from within the application. 1MB min. memory. $79.95. RT Computer Graphics, 505/982-1562, 800/245-7824.



The Santa Fe Collection

### SuperScript

Application designed for film and television script supervisors. Contains editable fields for scene number, description, camera

*(continues)*

got it made in the shades.

*Suggested U.S. list price. © 1990 Hewlett-Packard Company PEI2001

and sound info, takes within takes, time code, shot length, and comments. Includes a built-in stopwatch, multiple takes, forms, and a personalized top sheet. Automatically enters SMPTE Time Code on every take. 1MB min. memory. $249. Power-Training, 213/370-4793.

### TechWords

Utility that provides a list of technical words that can be merged into the spelling checker of most word processors. Contains over 40,000 terms used in aeronautical, chemical, civil, electrical, industrial, and mechanical engineering. Also includes terms from math and physics, as well as computer, life, space, planetary, and earth sciences. 512K min. memory. $79. Geocomp Corporation, 508/369-8304.

### Topic

Document-retrieval system designed to give corporate end users a comprehensive text-search and -retrieval system in a networked computing environment. System is based on a client-server architecture and uses a distributed processing model of networked computing to take advantage of all processors in the network. Users can access images, annotations, documents, news wires, and E-mail. 1MB min. memory. Retrieval Client $695 and up; $15,000 to $150,000 for various client-server configurations. Verity, 415/960-7600.

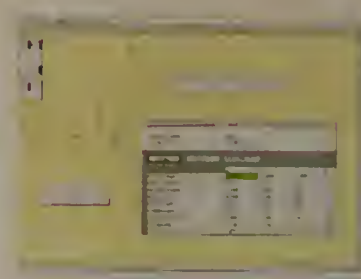
Topic

### Total Recall

Hard-drive-backup program for the Mac that includes a buffering feature that determines the best buffering method for a user's individual hardware configuration and enables the program to achieve a performance throughput of 38MB per minute when archiving to a hard drive and 6MB per minute for tape backups. 1MB min. memory. $99.95. Centa Systems, 714/693-8825.

### vPower

Parametric design package. User can find variables of dimensions of objects in CAD drawings, and change the variables and place them in formulas to see how the design behaves under different conditions.



vPower

Compatible with Claris CAD, VersaCAD, and any DXF file. 1MB min. memory. $799. Vision Software, 518/271-5118.

## ACCESSORIES

### 1991 Computer Events Calendar

Executive planner provides dates, locations, and contact information for more than 200 high-technology trade shows, analyst conferences, key vertical-market gatherings, and special events taking place each year. Includes domestic and international events in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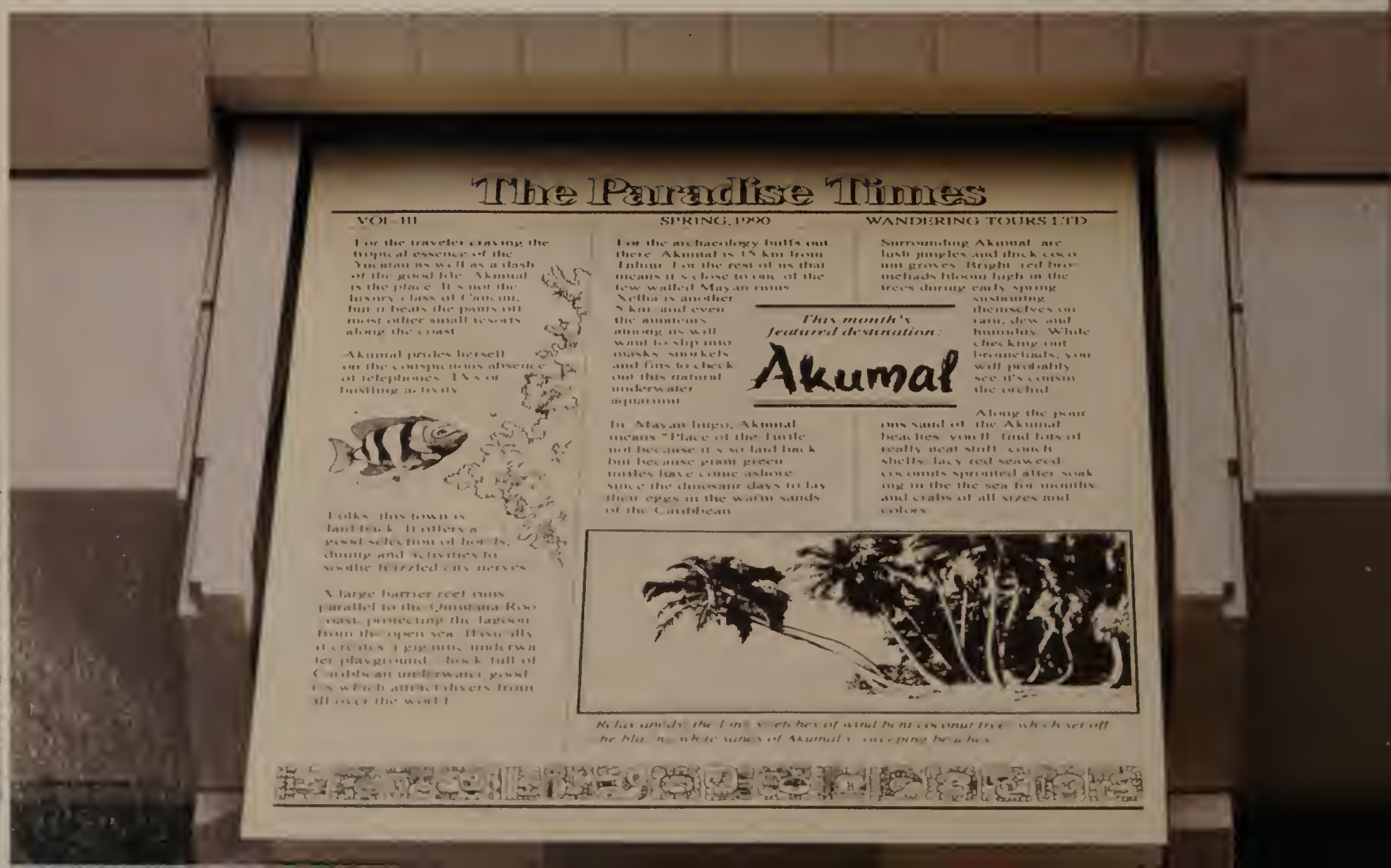

all high-tech areas, from semiconductors to super-comput-ers, the nuclear industry, and consumer electronics. $24.95 plus $1.50 s/h. Tech Trade Events, 415/428-2439.

**1991 Computer Events Calendar**

### Computer Christmas Cards

Holiday greeting cards with a personal-computer theme. Sold in boxes of 12. $15 per dozen. Palm Press, 415/486-0502.

**Computer Christmas Cards**

### Deskette

Disk-storage drawers for 3½-inch floppy disks that come in single-drawer to 16-drawer models with capacity to hold from 72 to 1152 floppy disks. Modeled in acrylic and available in clear; smoke; yellow; or neon pink, blue, or green. $14.95–$129.95. R&R Computer Solutions, 714/996-6545.

### Glare/Guard Traveler

Glare-guard screen for laptop displays. Designed to filter out 99 percent of glare. Made of durable, optically coated amber or gray safety glass. $149.50. OCLI, 707/545-6440.

**Glare/Guard Traveler**

### Hanging Disk Filer

Letter- and legal-size hanging disk filers that hold up to six 3½-inch disks and can hang in a filing cabinet. Color-coded in red, green, yellow, blue; made of 8-gauge, static-resistant plastic, and have optional clip-on label tabs. 1 to 5 boxes $995 each; volume discounts available. Eaton and Associates, 415/550-0325.

### Hard Shell Mac Case

Hard-shell carrying case for Macintosh 128K through Macintosh SE/30 models. Case is lockable; weighs 6 pounds; and has room to store cables, power cords, mouse, keyboard, and hard drive or small portable printer. $129.95. BCM, 800/432-5211.

### Neon Ultimate Carrying Case

Neon-accented Macintosh carrying cases that contain extra outside pockets with room for manuals, mouse pads, disks, and a notebook. Include a padded pocket for mouse, cords, and keyboard. Macintosh is protected by high-density foam and water-resistant Cordura shell. $139.95. I/O Design, 215/524-7277.

### Organizer Jr.

Pedestal-based 11-inch-high organizer and storage

*(continues)*


# have it all. (But keep it to yourself.)

**The HP DeskWriter printer puts laser-quality printing right at your fingertips.**

With a small size and a $995* price tag, the DeskWriter printer easily fits on your desk and in your budget. And its advanced 300 dpi inkjet technology lets you print sparkling text and detailed graphics.

The DeskWriter is also designed for easy use with your Macintosh, and has both serial and Apple Talk interfaces. It even includes scalable and outline fonts. Combine that with the DeskWriter's whisper-quiet operation, and keeping it to yourself will be that much easier. So call **1-800-752-0900, Ext. 1004** for your authorized HP dealer.

There is a better way.

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unit designed to accommodate personal laser printers, copiers, and fax machines. Contains two shelves for extra paper trays, paper, or an extra toner cartridge. Built-in cable guides keep power and AppleTalk cables neat; rolls on casters. $79.95. Costar, 203/661-9700.

## BOOKS

### The 1991 Computer Desk Reference & Appointment Calendar

Planning and scheduling calendar for computer professionals, enthusiasts, and industry watchers. Contains full 1991 daily calendar, quotes from notables within the computer industry, sections for names and addresses, online telephone access directory for the United States and Canada, corporate index, travel planner, and more. $19.95. Microsoft Press, 206/882-8080.

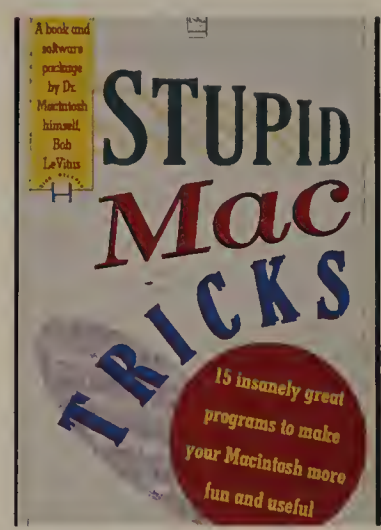
**1991 Computer Desk Reference**

### Making Your Computer a Design & Business Partner

Book to guide designers through the months before and during transition from traditional to electronic design. Answers the questions designers ask most often, regarding product time, type costs, equipment needs, cost of equipment and accessories, and how to gain the highest productivity at the lowest cost. By Lisa Walker and Steve Blount. $27.95. North Light Books, 513/531-2222, 800/289-0963.

### Stupid Mac Tricks

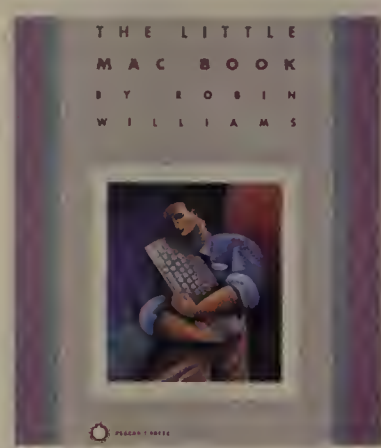
Book-and-disk package that contains a collection of applications, cdevs, and desk accessories that can be used to play practical jokes, program in sounds, or produce tricks on a Mac. Contains Talking Moose, Melt, EyeCon, and other programs designed to produce amusing results. 1MB min. memory. $19.95. Addison-Wesley Publishing Company, 617/944-3700.




**Stupid Mac Tricks**

### The Little Mac Book

Informal guide written for new and veteran Macintosh users. Contains charts of typefaces, special charac-




**The Little Mac Book**

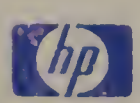

# Pigments for your imagination

**HP color printers let you draw splashy color from your Macintosh.**

Entertain your thoughts with HP's PaintJet and PaintWriter XL color printers. Both are fully Mac-compatible and let you use all Quickdraw-based software applications. That means high-quality Macintosh II output in 16.7 million colors.

Print on paper or transparencies with 13 scalable outline fonts. And for shared use, the PaintWriter XL offers AppleTalk, faster speed, and auto sheet feed. For sample output and the name of your authorized HP dealer, call **1-800-752-0900, Ext. 1167.**

There is a better way.

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ters, keyboard shortcuts, time-saving tricks, and troubleshooting advice. Covers the basics such as using the mouse, menus, windows, icons, folders, and the Font/DA Mover. Written by Robin Williams. $12.95. Peachpit Press, 415/527-8555.

### The Mac Is Not a Typewriter

Style manual designed to help create professional-level type on the Macintosh. Describes the rules and techniques for professional typesetting and how to adapt them to desktop publishing on the Macintosh. By Robin Williams. $9.95. Peachpit Press, 415/527-8555.

### The Network Product Guide

150-page compendium of over 400 network connectivity products for the Mac. Guide is divided into sections for Mac LANs, Mac-PC LANs, Mac-VAX connectivity, Mac-UNIX connectivity, Mac-IBM connectivity, and Mac-other connectivity. Also includes an 18-page glossary of important networking terms, product index, and list of vendors. $19.95 plus $2 s/h. Connections, 714/738-1492.

### Using QuarkXPress 3.0

Book designed to teach users how to use QuarkXPress 3.0. Provides practical, how-to information for all levels of users. Chapters are illustrated and contain actual screen images that step Macintosh users through explanations of the program, describe its potential, and its real-world applications. Book can be purchased with disk of terminology and keyboard shortcuts. Written by graphic designer Tim Meehan. Book only $24.95; book and disk $34.95. M&T Books, 415/366-3600.

### The Verbum Book of Electronic Page Design

Book that combines information on design principles and electronic page layout. Shows readers how to create attractive printed materials that communicate their message efficiently and effectively. Each chapter includes a portfolio of page designs created by a featured artist, with descriptions of the design techniques used. Written by Michael Gosney and Linnea Dayton. $29.95. M&T Books, 415/366-3600.

### The Verbum Book of PostScript Illustration

Instructional book for desktop publishers, illustrators, and graphic designers who use PostScript graphics programs. Each chapter highlights the work of top designers and illustrators as they demonstrate the electronic art-making process. Contains narratives by the artists on their conceptual vision and insights into the creative process. Chapters end with PostScript illustrations created by the featured artist. Written by Michael Gosney, Linnea Dayton, and Janet Ashford. $29.95. M&T Books, 415/366-3600. ■

To have your product considered for inclusion in *New Products*, send an announcement with product name, description, minimum memory, peripherals required, pricing, company name, and phone number (and two copies of software) to New Products Editor, *Macworld*, 501 Second Street., San Francisco, CA 94107.

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*Fileguard provides constant protection for your system. Files can be encrypted automatically or manually. Floppy drives can be locked to prevent unauthorized access. A log is kept on all system activities to pinpoint problems with security. Keep you confidential data confidential!*

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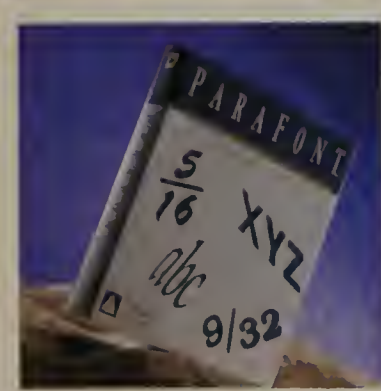

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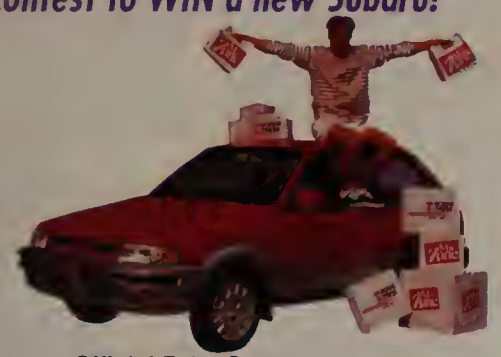

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# Quick Tips

## Why DAs beep, uncovering Trash, making ruled lines flow with text, and more

BY LON POOLE

As a reader pointed out in last April's column, an ImageWriter II normally prints Faster quality unidirectionally, but you can force bidirectional printing of Faster quality by pressing Caps Lock-Shift-Option while clicking OK in the Print dialog box. In August I described a method for canceling forced bidirectional printing: replace the ImageWriter file in your System Folder.

However, a simpler and more convenient technique for returning to unidirectional printing was suggested by Joseph A. Amarante of North Haven, Connecticut (and several other readers). Just press the ⌘ key while clicking OK in the Print dialog box.

Bidirectional printing speeds up Faster quality but may also noticeably degrade print quality.

### Mac Literacy

Sure the Mac interface is intuitive, but it isn't self-evident. *The Little Mac Book* by Robin Williams, answers the little questions every beginning Macintosh user has. It covers the stripped-down basics you need to know to operate a Mac, and nothing more. The book is published by Peachpit Press of Berkeley, California. Read it even if you never read a manual.

Williams's other new book from the same publisher, *The Mac Is Not a Typewriter,* is well worth reading, unless you use the Courier font exclusively. In 72 pages Williams explains what you have to unlearn from Typing 101 to give your output a more typeset look. If you pay attention to typographic details, your text will look better—especially at 300 dots per inch or higher resolution.

### Fixing Paragraph Spacing in Word

Microsoft has finally fixed a longstanding Word 4.0 problem. Unlike earlier versions, Word 4.0 doesn't ignore the extra space before a paragraph that falls at the top of a page. This led to uneven margins at the top of the page. (You set the amount of extra space using the Space Before option of the Paragraph command.) Version 4.0B suppresses the extra space when it occurs at the top of a page following an automatic page break. If later revisions to the document change the paragraph's location, Word 4.0B inserts the specified space before the paragraph. Other 4.0B improvements include

- Allowing fractional-width characters on an ImageWriter I and II (for compatibility with Adobe Type Manager)
- Mac IIci compatibility
- Text and color display on large monitors, on multiple-monitor configurations, and on monitors capable of displaying more than a million colors (24-bit display monitors)
- Compatibility with desk accessories using multiple windows
- Dialog-box display of drop-down lists that extend below the window

Registered owners can request Word 4.0B from Microsoft customer service (206/882-8088).

### Where Have All the DAs Gone?

**Q** I recently upgraded my Mac Plus to 2.5MB of RAM so that I could start using MultiFinder regularly. Unfortunately, when MultiFinder is active my desk accessories aren't usable. Choosing one from the Apple menu results only in a beep. This applies to all DAs—including basic ones like the Control Panel—even when no applications other than the Finder are open and 2076K of RAM is free. Can you help me get my DAs back?

Bruce K. Ferguson
Athens, Georgia

**A** You need to copy the DA Handler from your System Tools disk into the System Folder on each of your start-up disks. MultiFinder uses DA Handler to open desk accessories in the memory allocated to system software. (MultiFinder automatically increases the amount of memory allocated to system software to accommodate each additional desk accessory you open.) Whenever MultiFinder is not active, DA Handler is not used. Instead, DAs share the memory

*(continues)*

## KEY SUBSTITUTION

| | Control | Escape | Break | Long Break |
|---|---|---|---|---|
| MacTerminal | ⌘ | ` | Enter | Shift-Enter |
| Microphone | ⌘ | ` | ⌘–Up Arrow | ⌘–Shift–Up Arrow |
| SmartCom II | ⌘ | ⌘ | ⌘–comma | |
| White Knight* | Option | ` | Shift–Delete | ⌘–Shift–Delete |

** Requires setup as described in the program's manual.*

**When emulating a VT102 or VT100 terminal with a Mac Plus, you can usually simulate the missing Control, Break, and Escape keys by substituting keys that the Mac Plus keyboard does have.**

allocated to the application that is currently open.

You can bypass the DA Handler and open a desk accessory in the active application program's memory by pressing the Option key while choosing the desk accessory from the Apple menu. If you're using MultiFinder, don't press the Option key until after you pull down the Apple menu. With MultiFinder active, pressing the Option key as you click the Apple menu suppresses all desk accessories from the menu and brings the list of currently open applications to the top of the menu, where they're easier to choose from.

### Concealed Trash

**Q** With MultiFinder active, the Trash Can and other desktop icons are often hidden by windows. To throw away a file, you must shrink the windows, go to the Finder to trash the file, then enlarge the windows. What happened to user friendliness? Why does this behavior continue with each new release of system software?

Bringing the desktop icons to the top should be simple enough. As an alternative, a menu item called Trash It could be added. Is there some trick for doing this with ResEdit?

Douglas Ivers
Cary, North Carolina

**A** System 7.0 will let you hide layers so that, for example, you can work in the Finder without interference from the windows of other open (but inactive) programs. In the meantime, why don't you leave the Trash icon open? Then when you switch to the Finder, the Trash window will come to the top along with other Finder windows, even if the Trash icon is covered. Dragging to the Trash window works just as well as dragging to the Trash icon. I like your idea of a Trash It command.

### Control Emulation

**Q** I use a Macintosh Plus on a network to emulate a VT100 terminal. Is it possible to generate a Control command with the Macintosh Plus keyboard?

Jacobus van der Maas
Lausanne, Switzerland

**A** Because the Mac Plus keyboard doesn't have the Control, Escape, and Break keys you need for VT100 emulation, most communications

Imagine Losing Everything In Your Mac.

programs recognize alternate keys as substitutes for the missing keys. The table "Key Substitution" tells you which key to press.

### Tetris Touch

**TIP:** Have you hit the wall in your Tetris score? The following tip gave me a new high score the very first time I tried it. Choose Control Panel from the Apple menu; click on the Keyboard icon. Make a note of the current settings and then set the Key Repeat Rate to Fast and Delay Until Repeat to Short.

Because Tetris uses keyboard input, a faster repeat rate lets you shift falling pieces from side to side faster (using the 4 and 6 keys on the keypad), which is critical in higher stages of the game. You can also rotate pieces faster (using the 5 key on the keypad). Be careful, though, not to rest your finger on the 2 key, which causes pieces to drop straight down. You can quickly build up an awkward stack of pieces if you rest on that key a little too long.

Be sure to restore your normal keyboard settings before returning to more sedate applications.

Greg Mintner
Canyon Country, California

### Directory Scroll

**TIP:** When you need to scroll the list of files in a directory dialog box of an Open or Save command, you don't have to use the scroll bar. You can also click anywhere on the list of files and drag the pointer above or below the file list area.

Clay Olson
Santa Cruz, California

### Reclaiming High-Density Disks

**TIP:** I recently discovered that once a high-density (1.4MB) floppy has been formatted for DOS or UNIX file systems, the Macintosh SuperDrive will not format the disk for a Macintosh. To get around this problem, I use the Quick Copy program that comes with SUM II. I just open Quick Copy and select the Initialize Before Copying and Copy All Sectors options. I then take a high-density floppy disk that has already been initialized for the Macintosh and, following the normal Quick Copy procedures, copy it onto the disk that was formatted for DOS or UNIX. Presto! In a few seconds I have a reclaimed Macintosh high-density floppy.

Ken Kirksey
Auburn, Alabama

### Column-Width Adjustment

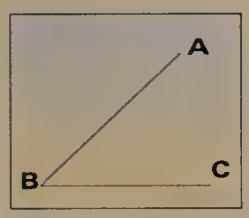
**TIP:** You can adjust the width of a column in a Microsoft Word table by dragging as you do in a spreadsheet. Start by selecting the rows that con-

*(continues)*

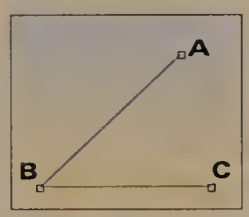
## Blend Effects

Imaginative use of Aldus FreeHand's Blend command (Special submenu of the Element menu) produces some interesting special effects. Two effects, submitted by R. Born of Anaheim, California, are illustrated below.

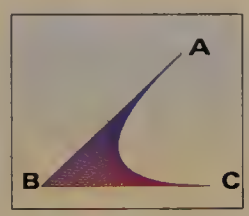
### Geometric Shapes




Use the Line tool to draw two lines (of any color or weight) at some acute angle. The lines must share a common point (**B**). Also, you must draw one line toward that point (**A** to **B**) and the other line away from that point (**B** to **C**).

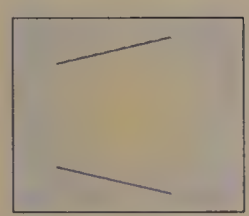



Select each line and ungroup it using the Ungroup command (Element menu). Then select point **A** of the diagonal line, hold down the Shift key, and select point **B** of the horizontal line.

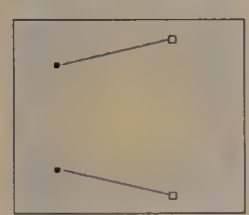



Produce an attractive geometric shape by setting the Blend command's Number of Steps option to 40 or higher. If the two starting lines are different colors or weights, the Blend command makes a smooth transition between them.

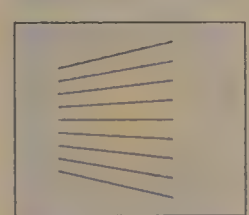
### Perspective Grid



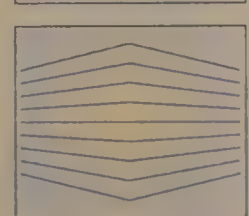
Draw a line at a shallow angle and clone it. Using the Reflection tool, press Option while clicking the clone. In the dialog box that appears, set the Horizontal and Center of Selection options. Click OK to flip the clone. Drag the flipped clone straight down.



Select each line and ungroup it using the Ungroup command (Element menu). Then select an end point on the first line, hold down the Shift key, and select an end point on the other line (on the same end of the line as the first end point you selected).



Generate the grid lines by setting the Blend command's Number of Steps option (the more steps, the finer the blend). Ungroup the blend lines, select all lines, and use the Group command (Element menu) to group them.



Clone the group of lines and use the Reflection tool to flip the clone across the vertical axis. The result is a mathematically perfect perspective grid with unseen vanishing points off the page.

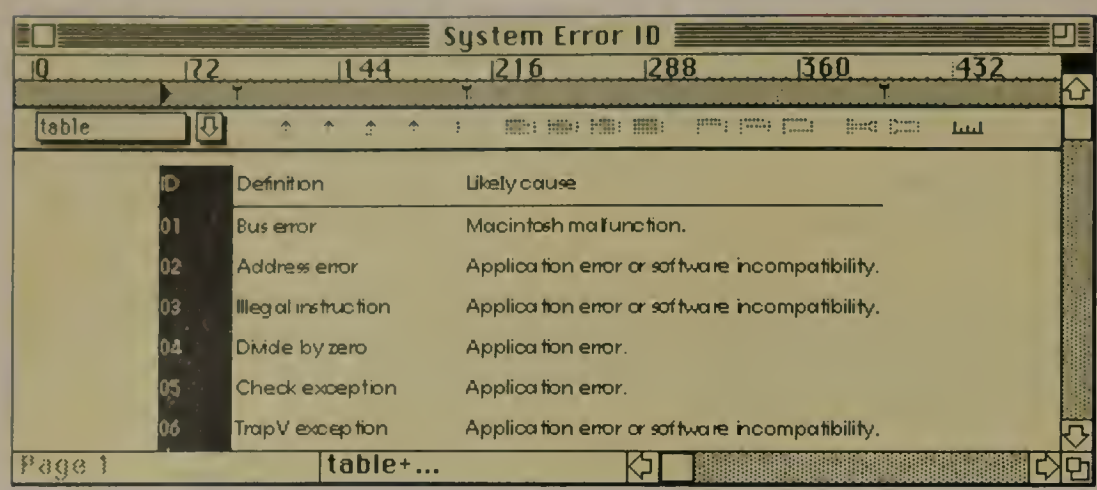



**TABLE RULER** If you click the Scale icon in Microsoft Word's formatting ruler, you see T-shaped column markers that you can drag to change the width of columns in the selected portion of a Word table. If the formatting ruler turns gray, as shown here, it means the selected rows have different formats. You can still adjust their column spacing by dragging the T-shaped markers, however.

tain the columns whose width you want to change. You can select just one column—any column —from those rows. Show the formatting ruler by pressing ⌘-R. Next, click the comb-shaped Scale icon at the right end of the formatting ruler (second from the right if you're using short menus). T-shaped column markers appear on the ruler. Drag those markers as you would indents or tabs, and see the column widths change as you do it (see "Table Ruler").

Don Beck
Stow, Massachusetts

### Flowing Rules with Text

**TIP:** Those who use ReadySetGo or DesignStudio can make rules that flow with their text (PageMaker has a special feature for this). To create a floating rule in a text block, create a blank line where you want the rule to begin, and move the insertion point to the beginning of that line. Set the font to Zapf Dingbats and the point size to the rule thickness you need. Set the tracking to 0.5 em using ReadySetGo's Track command (Format menu) or to 0.25 em using DesignStudio's Horiz Spacing command (Format menu). If you set the size smaller than 7 points, you may want to change the greeking threshold using the Preferences command (Special menu in ReadySetGo, and Document menu in DesignStudio) so the rule isn't greeked on the screen.

You create the rule by repeatedly typing a lowercase *N*, which in the Zapf Dingbat font generates a filled-box symbol (•). At small point sizes, typing a lengthy rule can be tiresome. To speed up the process, type a portion of the rule, select it, click at the end of the rule, and paste, paste, paste. You can delete any excess. You now have a rule that flows with your text. I have output this kind of rule at 2540 dpi, and it prints solidly. With

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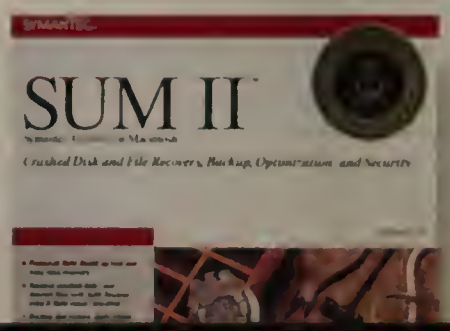


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*Stern Costa, MacWEEK, 10/3/89. **MacUser 1989 Editor's Choice, 5 Mice Rating, and Eddy Award for Best Utility. Macworld's 1990 Reader's World Class Award. Publish's 1989 Reader's Choice Award. Best seller through National Distributors: Ingram Micro D, Softsel, Kentil. SUM is a trademark of Symantec Corporation. © 1990 Symantec Corporation.

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sizes smaller than 2 points, you may need to experiment to get the thickness to match a tool-drawn rule exactly. For example, obtaining a 1-point rule requires setting the point size of the dingbat to 1.35.

Jeff Negran
New Brunswick, New Jersey

### Disappearing Ink

**TIP:** I was frustrated by text not printing below some of the SuperPaint 2.0 graphics I had pasted into my Microsoft Word documents. The mystery was solved when my friend Charlyn and I realized that the last text I had put in the draw layer of each troublesome SuperPaint graphic was white text. She had a similar problem with gray text. After encountering white or gray text in a SuperPaint graphic, the printer is not reset to black text until the next page.

To avoid this problem, make sure you type all nonblack text in a SuperPaint drawing before typing black text. To fix a finished drawing, either type some new black text in an empty white area and cover it with a white box (with white lines) or type a black letter on top of a black area. You can also delete an entire block of black text (select it with the pointer tool, not the text tool) and type a replacement text block. Simply deleting and retyping a word or two of black text will not fix the problem.

Shirley Kehr
Silverado, California

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# Getting Started with Networks

A NETWORK LETS YOU SHARE INFORMATION AND EXPENSIVE ADD-ONS. HERE'S HOW TO SET ONE UP AND WATCH IT GROW.

BY JIM HEID

If you use two or more Macs, chances are you can benefit from connecting them to each other to form a *network*. Wait! Don't turn the page. It's true that networking has its technicalities—bandwidths and bridges, twisted pairs and topologies—but even if you are new to the Macintosh you can set up a small network without immersing yourself in them. Small-scale Mac networking can be surprisingly easy and economical.

What's to gain? For one thing, your Macs can share an expensive add-on such as a laser printer or hard drive (see "Hardware You Can Share"). It's easier to buy a big-ticket item when you know that all your Macs will be able to share it.

Beyond sharing hardware, you can share information and ideas. Using *file server* software, you can store in one place files everyone needs to access—client databases, product fact sheets, downloadable laser printer fonts, or boilerplate templates for frequently produced documents. Using *electronic mail* software, you can send messages and files to co-workers. And with *multiuser* database software, everyone can access the same database file at once, eliminating the need to store a separate copy on each user's machine—and fretting over whose version is the latest.

Many people are intimidated by networking not only because of the jargon that surrounds it, but also because it provides so many sharing options. The best way to conquer that latter fear is to start small and add new capabilities as you need them—and as you master those you already have. This month, I present a road map you might want to follow in your journey to a networked office. Along the way, I'll examine networking's benefits and look at some products. "Networking for the Novice" (in this issue) provides more details on the steps involved in setting up a network.

### Phase 1: Sharing a Printer

At its simplest level, Macintosh networking means sharing a PostScript-based printer such as Apple's LaserWriter IINT, IINTX, Personal LaserWriter NT, or any of the other dozen or so Mac-compatible PostScript printers (see "Page Printers Revisited," *Macworld*, October 1990). Non-PostScript laser printers, such as Apple's Personal LaserWriter SC and GCC Technologies' PLP II and PLP IIS, cannot be shared on a network because they attach to the Mac's SCSI connector, which isn't designed with sharing in mind, and because they lack the ability to respond to numerous machines.

Sharing a PostScript printer is a breeze because all you need are cables that interconnect the Macs and the printer. You don't need to purchase any special networking software; Apple's LaserWriter *printer driver* files, included with the Mac, contain all the smarts needed to communicate with any Mac-compatible PostScript printer. Similarly, all PostScript printers contain built-in *print server* software that allows them to listen for numerous machines and handle print jobs on a first-come-first-served basis. In short, the Macintosh and the printer already know how to talk with each other—your job is to add the lines of communication.

Those lines can take a few forms. If you want the Apple brand name, endow each Mac and printer with a $75 LocalTalk Connector Kit, which includes a 6-foot length of LocalTalk cable and a small connector box that plugs into a Mac's rear-panel printer connector or into the printer itself. You also get a small connector called a *cable extender*, used for attaching two cables to each other. If you need longer cable lengths—perhaps to reach a Mac in another room—Apple offers a 30-foot LocalTalk cable for $75, and a 75-foot cable for $125. See "Networking for the Novice" for more details on cabling, including information on less-expensive alternatives to Apple's LocalTalk kits.

After you unite the machines, you need to configure each Macintosh for network printing. First, be sure the

*(continues)*

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## HARDWARE YOU CAN SHARE

Sharing hardware doesn't mean just hard drives and laser printers. Here's a sampling of the other types of hardware you can share on a LocalTalk network.

- *ImageWriters* Using Apple's $139 ImageWriter II/LQ LocalTalk Option board, you can share an ImageWriter II or LQ.
- *Telephone modems* Don't buy a modem for everyone on staff; buy a network modem such as Hayes's $499 Smartmodem 2400M or Shiva's $599 NetModem V2400 or $599 high-speed NetModem V.32.
- *Fax modems* You can share a fax modem such as Apple's now-discontinued AppleFax or Orchid Technology's $599 OrchidFax by using Solutions' $395 FaxGate Plus software with the $395 Microsoft Mail or CE's QuickMail ($189.95 for 1 user, $339.95 for 5, $499.95 for 10, $2299.95 for 50).
- *Serial devices* With Shiva's $399 NetSerial or Solana Electronics' $695 C-Server, you can put virtually any serial device—modem, pen plotter, daisy wheel printer—on a network.
- *Alternative storage devices* You can share tape backup drives, erasable optical drives, and removable drives such as Bernoulli boxes and Syquest drives. You can even share CD ROMs via an AppleShare server, provided the server's hard disk has enough free space to keep track of the CD ROM's vast number of files.

laser printer is warmed up (wait until it prints its start-up page). Next, use each Mac's Chooser desk accessory to turn on AppleTalk and select the LaserWriter printer driver icon. (If you don't see this icon, you need to copy it and the file named LaserPrep either from the Mac's system disks or from the disks that accompany the printer. Copy the files to the System Folder on the Mac's start-up disk.)

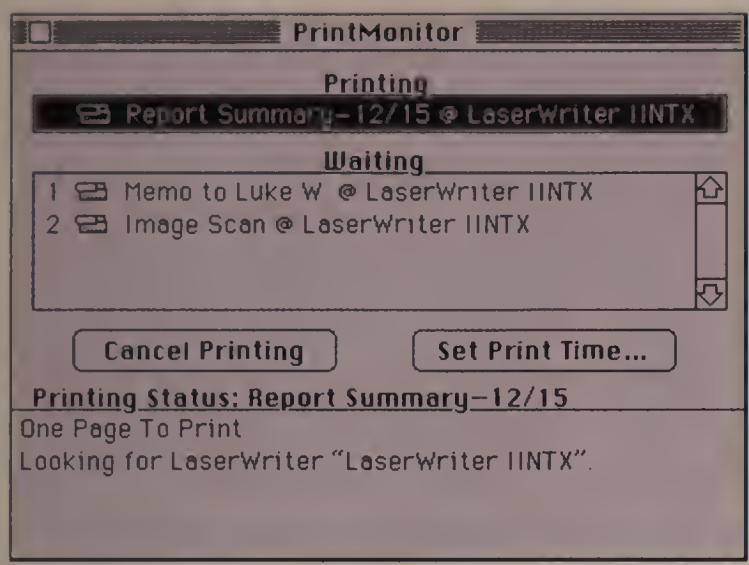
Before closing the Chooser, type a name in its User Name text box. Use the name of the person who uses that Mac, or a name that describes the Mac's purpose, such as Publishing Station. This name allows the LaserWriter driver to provide useful feedback when you're printing—more about that shortly.

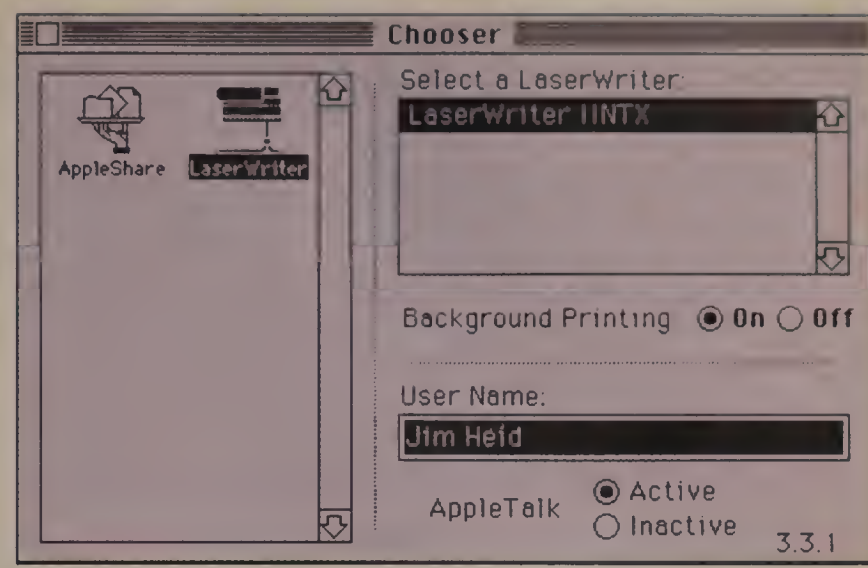
Finally, if you're using MultiFinder, activate the Background Printing option so you're not forced to wait while the Mac and printer communicate during each print job. Background printing intercepts data en route to the printer, saves it on disk in a *spool file*, and then quickly returns control of the Mac to you so you can get back to work. Then, a system program called PrintMonitor transmits the spool file to the printer in short bursts while you work (see "Monitor Your Printing").

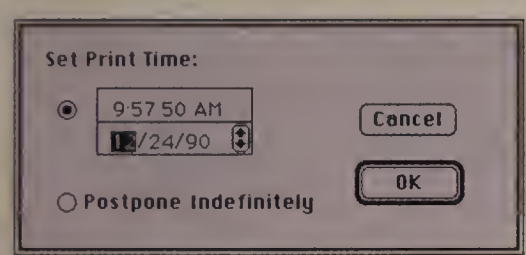
(If you're not sure whether you're using MultiFinder, glance at the right edge of the menu bar. If no icon appears there, you *aren't* using MultiFinder. You can activate MultiFinder using the Set Startup command in the Finder's Special menu; check your manual for details.)

After you perform these steps, close the Chooser and try printing a short document. If you're using MultiFinder with background printing on, you won't see any status messages (telling you who's printing what on which printer) unless you open the PrintMonitor window by choosing its name from the Apple menu. If you aren't using MultiFinder or if background printing is off, status messages appear at the top of the screen during the print job. If your test document doesn't print, retrace your steps and double-check the cables. If it does print, perform these steps on each Mac in the network.

If you always use the same printer, you need to perform the previous chores only once; the Chooser remembers that you've chosen the LaserWriter driver as well as the user name you typed and the name of the printer you selected. However, if you switch between two or more LaserWriters or other printers, you need to use the Chooser each time you change printers.




**MONITOR YOUR PRINTING** When you're using MultiFinder, selecting the Background Printing option in the Chooser (top right) eliminates having to wait for the printer. The PrintMonitor application (top left) displays the document names of jobs waiting to be printed. Status messages appear at the bottom of PrintMonitor's window (or at the top of the Mac's screen when background printing is disabled). By clicking on the Set Print Time button, you can delay printing until a specific time or postpone it indefinitely—using the pop-up dialog box (left).

### Phase 2: Electronic Mail

Once you've strung the lines between machines, you can add additional capabilities to a network by adding appropriate software. The next step might be to add software that lets you transfer files between Macs, enabling you to say good-bye to the so-called sneaker net—copying files to floppy disks and carrying them to other machines in your office.

Several categories of network software let you move files between machines. One is *electronic mail,* or *E-mail* software such as Microsoft Mail, CE Software's QuickMail, and Sitka's InBox. With E-mail software, you send files as *enclosures* that accompany messages you type (see "Files Enclosed"). When messages arrive at their electronic mailbox destination, the recipients can save the enclosed files on their own disks. You can even request a return receipt message, which notifies you when a message is read. In large offices, E-mail not only makes it easy to transfer files, it also helps eliminate distracting phone calls and annoying games of phone tag.

**E-mail Details** Each brand of E-mail software has its own operating style, but all require similar setup steps. First, you designate one Mac as the E-mail server, the electronic post office that store messages and forwards them to their addressees. You can still use the server Mac to run other programs, but you'll notice it slows down when people are sending and retrieving mail as it divides its time between postal duties and running other programs.

For this reason, it's important to carefully consider which Mac in a network is best suited to being a server. You should use a machine with several megabytes of free hard disk space and at least 2MB of memory—more if you plan to use MultiFinder on that machine. If you anticipate heavy mail volume, consider using a faster Mac—an SE/30 or a member of the II family—instead of a Plus or an SE. And make sure you use a machine that's reliable—if someone in your office likes to run prerelease versions of software (which may contain bugs) or games (which often monopolize the Mac's hardware), that person's Mac is not an ideal server.

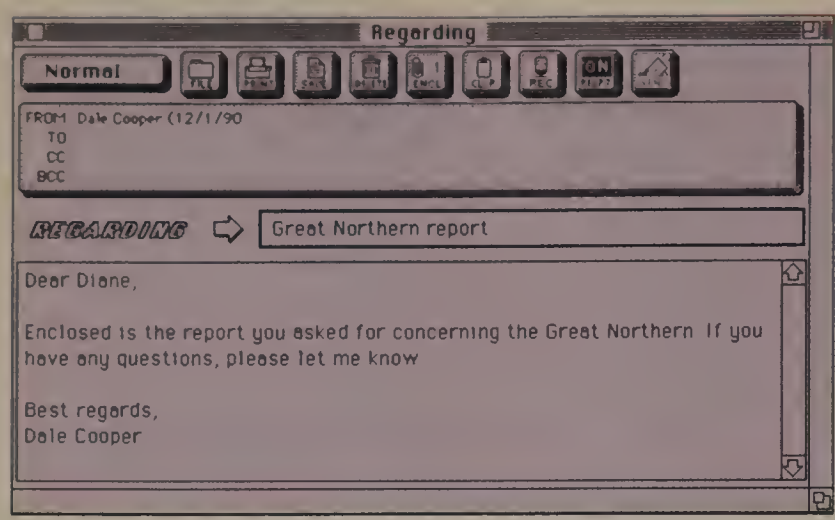
After you choose a server, you set up the E-mail server software, which usually comprises a start-up document (INIT) that loads the server software into the Mac's memory during start-up and an *administrator* program that you use to create a mailbox for each person in the network. Finally, install on each Mac the E-mail *client* software, which generally includes a DA that lets the user read and send mail and a start-up document that lets the Mac notify the user when a message arrives.

Microsoft Mail, QuickMail, and InBox can each easily meet the needs of a small network. As your network and needs grow, however, you need to decide between Microsoft Mail and QuickMail, both of which currently provide more features than InBox. QuickMail wins the features derby, but it's harder to learn. An advantage to Microsoft Mail is that it lets you exchange mail and documents directly within Microsoft Word and Excel, Aldus PageMaker 4.0, and several other applications. (For a detailed comparison of these packages, see "E-Mail: A Postal Inspection," *Macworld,* June 1990.)

For a simpler variation on the file-transfer theme, investigate file-transfer utilities such as Traveling Software's LapLink Mac III Network Pac, Gizmo Technologies' Send Express, or Claris Corporation's Public Folder, which is free to registered users of Claris products. These utilities don't let you type in messages to be sent; they simply beam existing files from one machine to another.

And then there are more specialized products such as Farallon Computing's Timbuktu and Microcom's Carbon Copy Mac software. Both transfer files, but they aren't E-mail packages; instead, they let you control one Macintosh from another, for

*(continues)*




**FILES ENCLOSED With electronic-mail software such as CE Software's QuickMail, shown here, you can enclose disk files with messages. The recipient clicks on the ENCL button to "retrieve" (save) the file.**

example, to help someone who's struggling to master a difficult program. You can take over all the screens in the office —great for group training sessions. And you can use one Mac's modem or ImageWriter printer from another Mac. With Farallon's Timbuktu/Remote, you can even control a Mac over the telephone lines, although you need a high-speed modem such as the Hayes Smartmodem 9600 for tolerable performance. Carbon Copy Mac includes remote-access features.

### Phase 3: Creating a File Server

E-mail products can eliminate sneaker wear but not worries over whose version of a certain document is the most current. If anything, swapping files between different machines only fuels those fears. And having important files scattered across the hard drives and floppy disks in an office makes backing up difficult.

The solution? Use file-server software to make one or more hard drives available to the entire network. A file server is an electronic version of the office filing cabinet, providing shared storage for files that everyone needs (or that only certain people need—you can create private folders that can't be used without a password). Backing up is simplified, since all the important documents are stored in one place. And the entire office can take advantage of that high-capacity hard drive you just bought.

Or so go the claims. In reality, a network's hard drive isn't nearly as fast as a *local* one (attached directly to your Mac) because LocalTalk transfers data more slowly than the Mac's SCSI port does. For example, Microsoft Excel takes about 10 seconds to start from my local hard drive but over 30 seconds to start from my file server. What's more, putting all that extra data on a network's cabling slows down everything else that takes place on the network, such as printing and exchanging E-mail. Thus, it's best to use a file server to store only documents, not programs.

(It's worth noting that network cabling systems such as *Ethernet,* widely used with Digital Equipment Corporation's VAX minicomputers, are far faster than LocalTalk cabling, but are too costly to be practical for small networks; Ethernet requires that you put $500-to-$1000 expansion boards in each Mac. What's more, to use a PostScript printer on an Ethernet network, you need a *protocol converter,* a kind of network interpreter that translates between the different communications rules used by Ethernet and LocalTalk.)

**Two Ways to Serve** File servers come in two flavors: *distributed* and *dedicated* (see "Server Approaches Compared"). With distributed serving, anyone in the network can turn his or her machine into a file server by *publishing* one or more folders—or the entire contents of a hard drive. Once it's published, anyone on the network can *mount* it and use it as though it were local. File-server software using this approach includes Sitka's Network Bundle for the Macintosh (formerly TOPS) and Information Presentation Technologies' Personal Server Network (PSN). Apple's System 7.0, due out next year, will also provide distributed server features.

With the dedicated approach, you set aside, or *dedicate,* one Mac and its hard drive to act as a server for everyone. A dedicated server can't run applications because the server software all but monopolizes the Mac's hardware. A server can, however, run E-mail server software. Apple's $799 AppleShare FileServer, which supports up to 50 users, is the only dedicated server software available that uses a Mac as the server. (I'll describe some products that let you turn an IBM PC into a server shortly.)

Clearly, distributed file serving is the more economical approach. Neither Network Bundle nor PSN requires any extra hardware beyond cabling. With Network Bundle, you simply buy a copy of the software for each user; it retails for $299 but is often discounted to around $190. Network Bundle also includes the In-Box E-mail software. PSN retails for $189 per machine.

One downside to distributed file serving is that someone can *unpublish* a folder or hard drive at any time, with disastrous results for anyone using it. Network Bundle and PSN provide some safeguards for this, but it still can happen. And of course, a Mac acting as a file server slows down when others are accessing its hard drive. For more details on file-serving products, see "File Services," *Macworld*, August 1990.

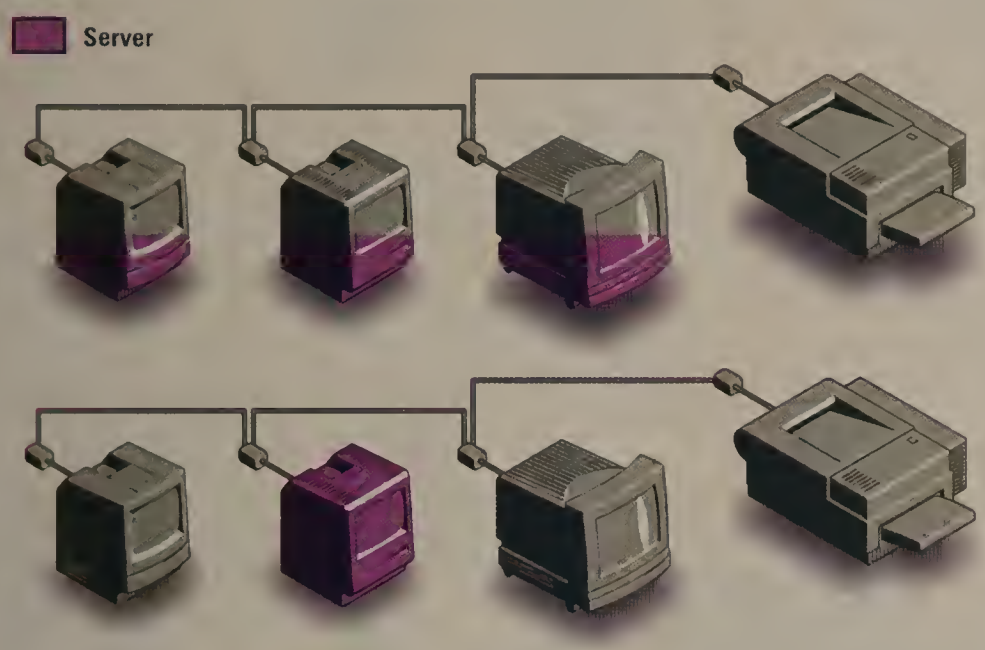
### Application Software Considerations

A file server lets you keep all your documents in one place, but it won't necessarily let everyone access the same file simultaneously. Whether that's possible depends on the particular program you're using.

- Microsoft Works lets numerous users open the same file, but only the one who opened it first can modify it. Anyone else must use the Save As command to give it a new name. Microsoft Excel works similarly.
- Aldus PageMaker 4.0 lets numerous users open a template or a copy of a publication, but only one person at a time can open an original publication.
- Microsoft Word won't let more than one person open a document unless they all check the Read Only option in the Open dialog box. (As an alternative, you can use the Finder's Get Info command to lock the document.) To modify the file, you must save it under a new name.
- Claris Corporation's MacDraw II lets

## Server Approaches Compared

With distributed file serving (top), you can make any Mac in the network act as a server by publishing one or more folders or the entire contents of a hard drive. A server can still be used to run application programs, but its performance slows when other users access its hard drive. With dedicated file serving (bottom), a Mac is set aside to act as a server. A dedicated server can't be used to run programs, but it could run electronic-mail server software.




multiple users open a file, but only the person who opens it first can save changes normally (that is, by using the Save command). If others try to save changes they've made, a message asks if they want to save the changed document under a new name or not save the changes after all.

- Claris's FileMaker II and FileMaker Pro, ACIUS's 4th Dimension, and Fox Software's FoxBase+/Mac are multiuser database managers that let numerous users work simultaneously with a database file. However, only one person at a time can modify a given record (one entry in the database, such as someone's name and address). Multiuser data managers also provide security features that let you make certain information available to only certain people. In a personnel database, for example, you might want to give everyone access to employee names and phone extensions, but only certain managers access to salary information.

As you can see, not all programs behave satisfactorily on a network. After setting up a network for file serving, test your applications to see how they behave when more than one person tries to open a document.

### Other Networking Options

After you master printer sharing, electronic mail, and file serving, you might want to investigate more advanced networking options. If you use IBM PCs, PS/2s, or compatibles, you can tie them into the network using LocalTalk expansion boards such as Sitka's FlashCard, Apple's LocalTalk PC Card, or DayStar Digital's LT200 Connection PC and, for IBM PS/2s, LT200 Connection MC. Apple's AppleShare PC lets LocalTalk-equipped PCs access an AppleShare server. You can also turn a PC into a server for Macs using software such as Novell's NetWare, DayStar Digital's FS100, and 3Com Corporation's 3+Share. Microsoft Mail, InBox, and QuickMail are available for PCs. And there are PC-oriented E-mail packages such as cc:Mail LAN Package for Macintosh (from a company by the same name), Dayna Communications' DaynaMail, and 3Com's 3+Mail for Macintosh.

If you have employees who travel frequently or work at home, you may want to give your network *remote access* features to allow those users to dial in and access the file server, E-mail system, and even laser printer. Shiva Corporation's NetModems include dial-in access software for Macs; Shiva's DOS Dial-In package allows PCs to call home. Infosphere's Liaison software also allows dial-in access. For those who exchange E-mail via telecommunications services such as MCI Mail or CompuServe, QuickMail, InBox, and Microsoft Mail provide *gateway* features that unite a network and a service by automatically dialing the service at specified intervals and sending or retrieving mail.

Then there's *groupware,* a new genre of network-oriented software designed around the fact that people often collaborate on projects. Farallon's Timbuktu and Microcom's Carbon Copy Mac enable users to control each other's machines. Mainstay's MarkUp lets multiple users electronically annotate a document and keeps track of when comments were made. CE Software's In/Out lets you track the whereabouts of the employees in your office.

But before venturing into these waters, master the basics. Add one capability at a time to your network, and be sure everyone understands it before expanding further. And don't ignore your network-administration duties: Develop a filing system for your server. Be on the alert for viruses—networks allow them to spread easily (see last June's "Getting Started with Virus Protection"). Use the same version of the LaserWriter driver on each Mac.

Follow these basic guidelines, and you'll have fewer technical problems and questions to answer. In short, you'll increase your net's worth. ◻

See *Where To Buy* for contact information

*Jim Heid is a* Macworld *contributing editor who focuses on Mac fundamentals. His latest book, coauthored with Peter Norton, is* Inside the Apple Macintosh *(Brady, 1989).*

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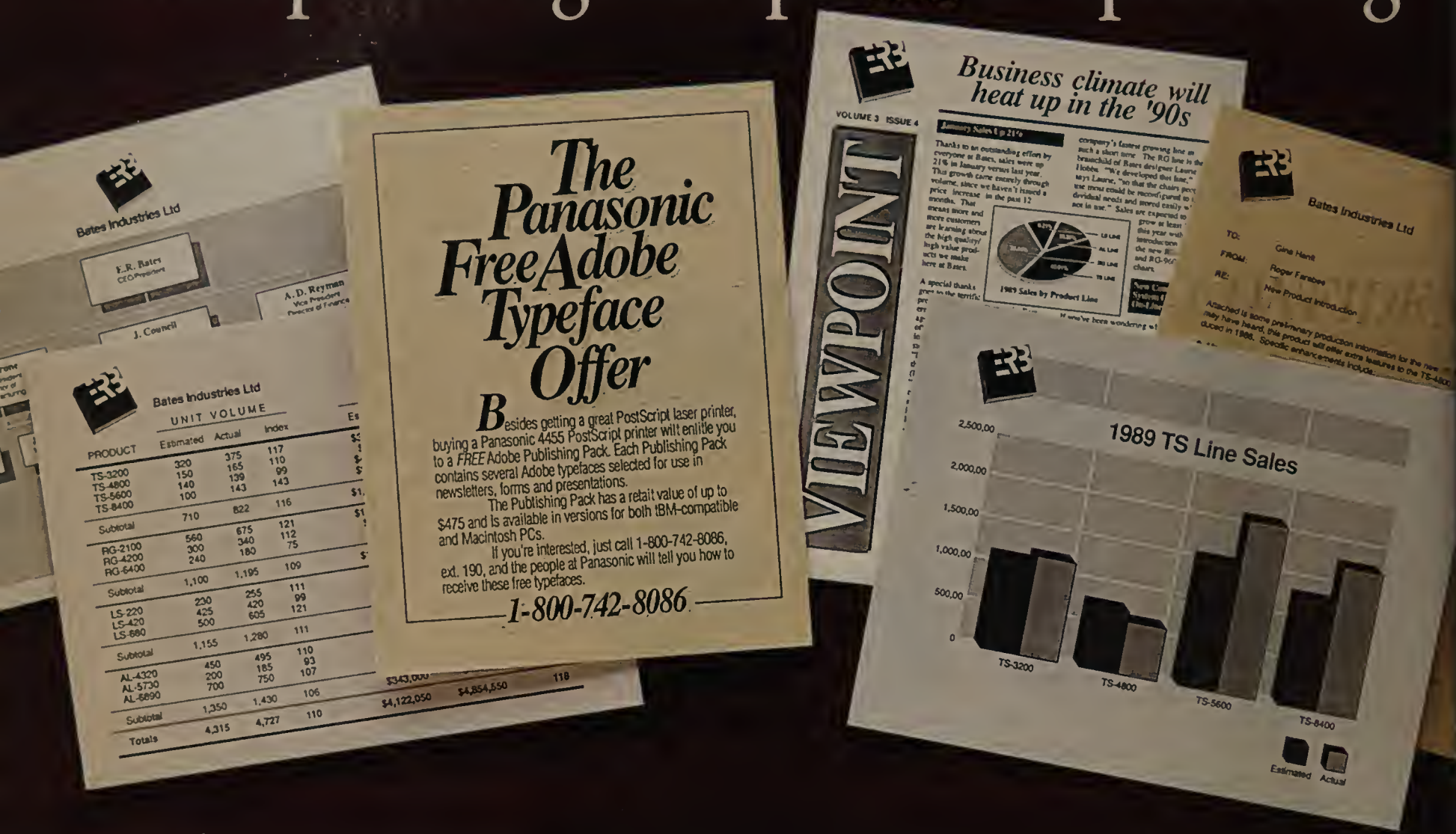


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# Insights on MacDraft 2.0

## Precision drawing at warp speed

BY CHARLES SEITER

MacDraft has been a strong competitor of MacDraw since it first appeared, and MacDraft 2.0 has a selection of new features that make it even more attractive. This program has a bit of an identity problem, however. While it has features that go beyond traditional drawing programs, it's not intended to be a true CAD package (IDD offers Dreams for CAD users). Most of the tips here are directed toward MacDraft's target users—people who occasionally need a precision drafting program and thus require simplicity as well as a feature-rich drafting environment. (For a review of MacDraft, see *Reviews* in this issue.)

### Trick Clicks Zoom Quick

The fast way to activate the magnifying glass is to hold down the Shift key and click on the pointer tool in the Draft palette. Position the magnifying glass cursor over the part of your drawing you want to inspect. When you click the mouse button, you'll zoom in on the drawing, magnifying your view by 2 times the original size. Keep clicking, and the view keeps zooming by 2 times with each click. To zoom back out, hold down the Option key and click the mouse button. You will notice that the plus sign in the magnifying glass has turned to a minus; every time you click the mouse button the view zooms back out by 2 times. To get back to a standard cursor, just click the pointer tool.

SCOTT BALDWIN

### Firing Blanks

At the bottom of the drawing window, next to the pan tool (usually called the grabber hand), there is a little blank space on the bar. If you click here after selecting an object that has been filled with a pattern or a color, that object will be converted to No fill.

### Quick on the Redraw

If you have to do lots of scrolling through a complex document, do this first. Choose Hide Fills from the Fill menu, hide the drawing layers you're not using, and select Hide Line Styles from the Line menu. You can always reinvoke the fills and line styles when the redrawing is finished. If you want to stop a redraw operation, hold down ⌘ and the period key.

### Long Division

Very often in a drawing you will need to bisect a line segment, whether it's a free-standing line, the edge of a polygon, or a piece of curve. Here's what to do:

1. Click on the line with the pointer to show existing handles.
2. Select the Add/Delete Handle command from the Edit menu.
3. Hold down the Shift key and click on the line you want to bisect. You will see a new handle positioned exactly in the middle of the line. This will also work on irregular segments of curves drawn freehand; what happens is that the program gives you a new handle that bisects the segment you click, between the two nearest handles (see "Splitting the Difference").

*(continues)*

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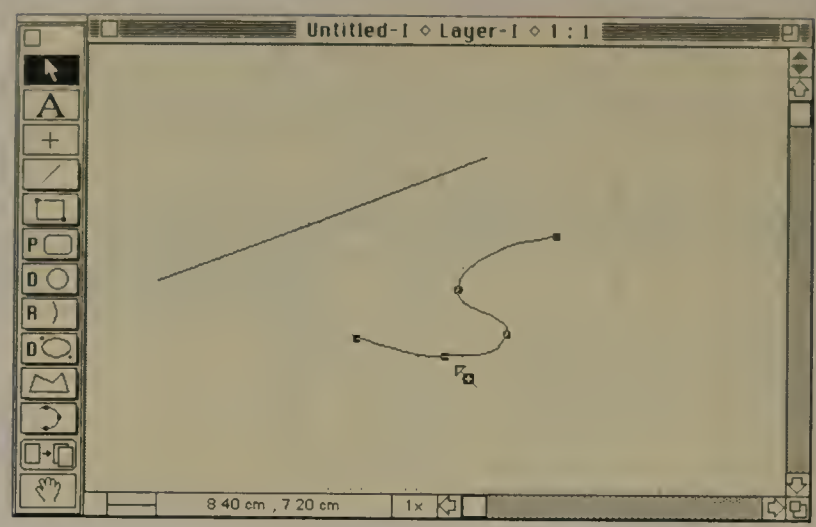
I certify that the statements made by me above are correct and complete. Jerry Borrell Editor




**SPLITTING THE DIFFERENCE** To bisect a line segment, hold down the Shift key when you select Add/Delete Handle from Edit. Click on the line edge, and the handle will be precisely positioned halfway between the two handles defining the segment.

### Getting a Handle on Curves

Normally, when you edit a bezier curve in MacDraft you select a handle on one side of the curve and move it. This lets you change the shape of each side of the curve independently of the other side. Sometimes, however, you want to make sure that the resulting edited curve presents a smooth flow from one segment to another, meaning that you want to control both sides of the curve simultaneously. You can constrain the handles of a bezier curve to move in tandem instead of independently if you hold down both the Shift and Option keys before editing the curve.

### Easy Dimensioning

Most precision drawings will require dimensioning lines. The standard way to add them to a MacDraft drawing is to go to the Line menu, pick a line style and an end-mark style, and then select the dimension line choice (XX, the last item in the menu). The problem with this arrangement is that you then have to reactivate the Line menu and readjust the line style if you want to continue drawing with a line style that's different from the dimensioning line style you selected.

Fortunately, there's a slick way to introduce dimensioning lines (with their associated line styles and end marks) without setting and resetting styles. If you hold down the Tab key and then click on a line-drawing tool, the line you draw automatically becomes a dimensioning line, and you can introduce dimension lines anywhere in the drawing. Now, when you release the Tab key, you revert to standard line drawing.

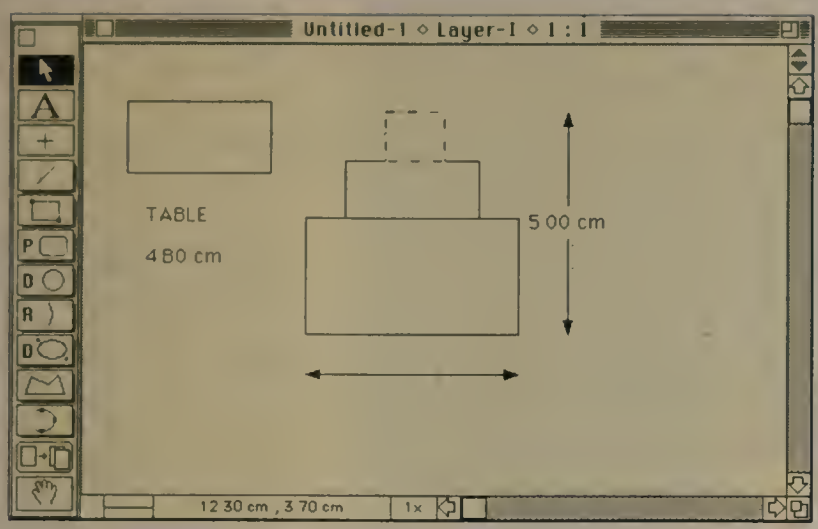
Because MacDraft is an object-oriented drawing program, you can do another useful dimensioning trick: extracting dimension data for reference in a table. First, draw the dimensioning line you need in the drawing. Then select this line and choose the Ungroup command from the Arrange menu (this disconnects the text associated with the dimension line from the line itself). Deselect both elements by clicking in a blank area of the drawing. Now click on the text to select it and drag it to the desired area, such as an entry space in a table. Because the program still associates the text's numerical measurement with the dimensioning line in the drawing, when the line is resized (you can experiment with this by dragging one of the end-handles) the entry in the table will automatically update to reflect the new size (see "Tabling a Motion").

## KEYBOARD NOTES

| | |
|---|---|
| ⌘-period | Cancel redraw |
| Shift click (on pointer tool) | Activates magnifying glass |
| Hold spacebar | Converts pointer to hand |
| Hold Shift (on Add/Delete tool) | Bisects line with a click |
| Tab (on a line-drawing tool) | Converts to dimension line |

### Good References

Using the datum point feature of MacDraft, you can establish a reference point (on an object or a group of objects) that can




**TABLING A MOTION** After adding a dimensioning line into a drawing, you can select the line, choose Ungroup from Arrange, select the dimension information separately, and move it to a table. Here the horizontal dimension has been moved under the word *table*.

be used in several ways: for exact placement of objects when you paste one set over another, for establishing a point of rotation for objects, or for distributing objects along a line at specified distances from a reference point. The standard way of distributing objects is to use the Distribute On Line item from the Arrange menu—but objects are attached in a clump along the line and must be spaced out manually. A better method is a variation that automatically and precisely spaces objects along the line by reference to a datum point on the square instead of its center (the usual Distribute On Line reference point). First, make a square. Then pick the Edit Datum command from the Edit menu, and click on the upper-left corner of the square (this establishes the datum point). Click on the pointer tool to exit the Edit Datum mode.

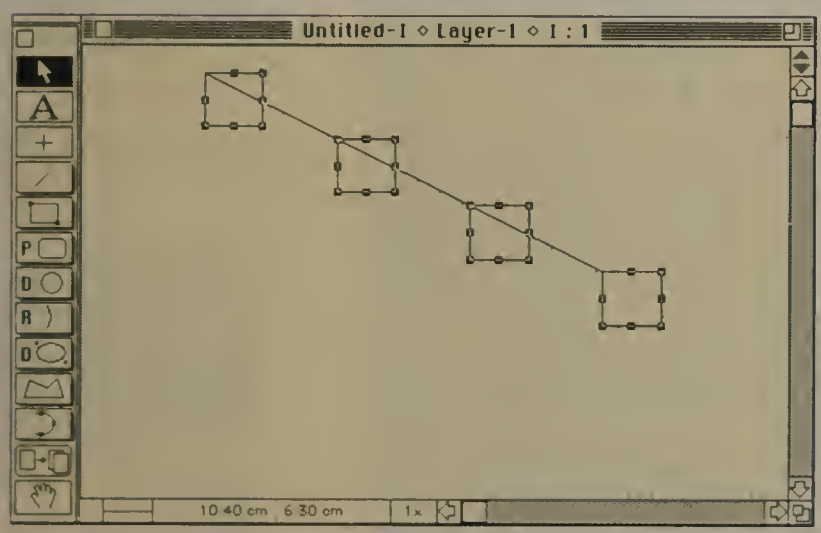
Now duplicate the square three times and make sure all three squares are selected (Shift-click if necessary). From the View menu select Show Size so that distances appear in the display at the bottom of the drawing (you may find it easier to follow positioning if the display is in decimal distances—centimeters—rather than inch fractions). Hold down the Option key before opening the Arrange menu, and select the Distribute On Line command. Use the pointer to indicate where you want the first square to appear on the drawing, and hold the mouse button down as you drag to distribute the squares to precise separation distances (the squares string themselves out proportionally along the drag line, so you need to note only the distance of the end point of the line). "Distribution" shows the result.

### Sharing the Wealth

If you've found a tip or shortcut not mentioned here, spread the word to other *Macworld* readers by sending it to *Quick Tips, Macworld,* 501 Second St., San Francisco, CA 94107. ■

See *Where to Buy* for contact information.

*Charles Seiter uses Macintosh drafting and CAD programs in designing analytical equipment for molecular biology.*




**DISTRIBUTION** The squares were positioned using the Edit Datum feature. Picking a reference, or datum, point in the upper-left corner of the object allows better positioning with the Distribute On Line command than does object centers as references.

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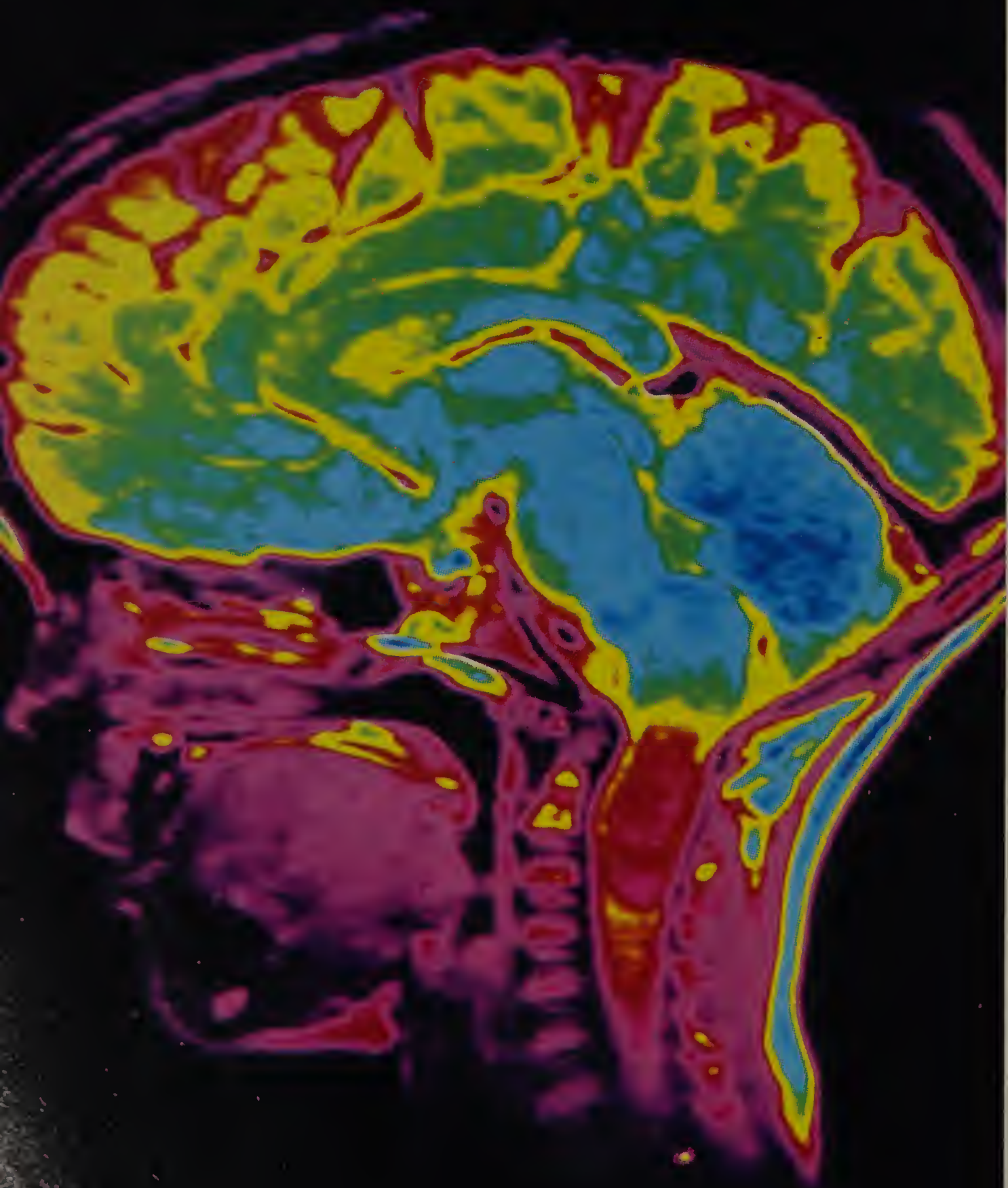

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# UPDATES

*Here's our list of the current shipping versions of Mac software at the time we went to press. We hope you'll find it useful—because these days, keeping track of the latest CPU is tough enough.*

**4th Dimension version 2.1** runs faster in less memory than previous version. Find in Array starts searching at the first element instead of zero element, and a pop-up list of entry filters has been added to the Field and Object definition dialog boxes. ACIUS, 408/252-4444. Contact vendor for upgrade policy; $795 new.

**Nisus version 3.0** has redesigned menus to make features more accessible, changed the name of some menu items to make their functions more obvious, and added a new Programming Dialect Module to the macro language. Includes noncontiguous selection, enhanced graphics with page-layout capabilities, increased Script Manager compatibility, style sheets with paragraph and character styles, mail merge, and extended keyboard support. Paragon Concepts, 619/481-1477. Contact vendor for upgrade policy; $395 new.

**PixelPaint Pro version 2.0** lets users autoscroll through images up to 4K by 4K; permits semitransparent masking; allows you to reposition and edit any shape or text after its creation; provides adjustment of color, contrast, and brightness; and includes the ability to work with tools such as pencil and airbrush. SuperMac Software, 408/245-2202. $125; $799 new.

**Virex version 2.8** has been updated to detect and treat two new viruses, CDEF and MDEF2. HJC Software, 919/490-1277. $15; $99.95 new.

## PRODUCT UPDATES

| Product | V. | Req. | Rev. | Price |
|---|---|---|---|---|
| 1st Aid Kit ★ | 2.8 | 512KE/3.0 | | * |
| 4th Dimension | 2.1 | 1MB/6.02 | 3/90 | Free |
| Aatrix CheckWriter II ★ | 2.01 | 512K/4.1 | | $10 |
| Aatrix TimeCard | 2.0 | 512K/4.2 | | Free |
| Accountent Inc., Pro | 1.03 | 1MB/6.03 | 9/90 | $19.95 |
| ACCPAC Bedford Simply Accounting | 1.1 | 1MB/5.1 | | $50 |
| AccuText | 2.0 | 4MB/6.02 | 2/90 | * |
| Adobe Type Manager | 1.2 | 1MB/6.02 | 2/90 | Free |
| AdWriter | 2.0 | 1MB/6.0 | | Free |
| Alter Dark | 2.0 | 512KE/4.1 | 7/90 | * |
| Alchemy | 1.1 | 1MB/6.0 | 10/90 | $25 |
| Aldus FreeHand | 2.02 | 1MB/6.03 | | * |
| Aldus PageMaker ★ | 4.0 | 1MB/4.1 | 9/90 | * |
| Aldus Persuesion | 2.0 | 1MB/6.0 | | * |
| AmPack Plus ★ | 4.2.2 | 512K/3.2 | 1/90 | $29.95 |
| Analog Connection WorkBench | 3.0 | 1MB/5.0 | 5/90 | $50 |
| Anatool ★ | 3.1 | 512K/3.0 | | $35 |
| AntiToxin | 1.3 | 1MB/6.0.2 | 1/90 | $15 |
| Aperture | 1.7 | 2MB/6.0.3 | 7/90 | * |
| APL.68000 | 7.0 | 512K/3.2 | | * |
| AppleShare File Server | 2.0 | 512K/3.2 | | * |
| ArchiText | 2.0 | 1MB/6.02 | | Free |
| Aristotle's Politics | 2.0 | 2MB/6.03 | | Free |
| The Art Importer | 2.0 | 1MB/6.0 | 5/90 | $20 |
| ArtRoom | 3.0 | 512K/3.2 | | $199 |
| AutoCalc | 2.0 | 1MB/6.0 | | $95 |
| AutoSave II | 1.1 | 512KE/4.2 | 7/90 | $7.50 |
| A/UX | 2.0 | 4MB/6.0.5 | | * |
| Aztec C | 3.6 | 512KE/4.2 | | * |
| BackFax ★ | 1.02 | 1MB/6.03 | 1/90 | Free |
| Back to Basics Professional | 2.0 | 512K/3.2 | | $75 |
| Bridge | 6.0 | 512K/3.2 | | $17 |
| Business FileVision ★ | 1.5 | 1MB/6.02 | | * |
| Business Sense ★ | 1.2 | 1MB/6.0 | | * |
| Business Session H | 3.2 | 512K/3.2 | | Free |
| CA-Cricket Presents | 2.0.1 | 1MB/6.0 | | * |
| Calculator | 2.06 | 512K/3.2 | 4/90 | $25 |
| Construction Set ★ | | | | |
| CenDpener | 1.1 | 512K/3.0 | | Free |
| Cenvas | 2.1 | 1MB/6.0 | | * |
| Capture | 3.0 | 1MB/6.0 | 2/90 | $15 |
| Centrel System Manager | 2.1 | 1MB/5.0x | | * |
| Chameleon | 3.0 | 512K/3.2 | | Free |
| ChromeScen | 1.1 | 4MB/6.02 | | Free |
| Claris CAD | 2.0 | 2MB/6.0 | | $79 |
| Client/Mac | 2.0 | 1MB/6.0 | | $370 |
| Codecheck | 2.0 | 1MB/6.0 | | Free |
| Colleague 2 | 2.1 | 2MB/6.03 | | Free |
| Colorset ★ | 1.5 | 1MB/6.0 | 6/90 | Free |
| Comment | 2.02 | 1MB/6.0 | | * |
| Commtact | 2.0 | 1MB/6.0 | | Free |
| CommUnity Mac ★ | 1.3.1 | 1MB/6.0 | | * |
| CompileIt | 1.5 | 1MB/6.02 | 3/90 | $30 |
| CompuServe Navigator ★ | 2.1 | 512K/3.2 | | * |
| Computerized Classic Accounting | 2.2 | 1MB/6.0 | | * |
| ConcertWare | 5.1 | 512KE/4.2 | | $35 |
| Control II | 1.1 | 2MB/6.04 | | Free |
| CopyFlow | 2.0 | 2MB/6.0 | 6/90 | Free |
| Cue | 3.0 | 1MB/6.03 | | * |
| **DecEasy Light Checkbook Accounting** | **2.0** | **1MB/6.03** | | * |
| Data Desk | 3.0 | 512K/4.02 | 6/90 | $125 |
| DataMerge | 2.0 | 512K/3.2 | | Free |
| dBase Mec ★ | 1.01 | 1MB/4.1 | | Free |
| Deluxe Music Construction Set | 2.5 | 512K/6.02 | | * |
| Design Dimensions ★ | 2.15 | 5MB/6.03 | | Free |
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| EndNote | 1.2 | 512KE/3.2 | | Free |
| Exodus | 2.0 | 1MB/6.0 | | $50 |
| Extender GrafPak | 3.0 | 1MB/6.02 | | $30 |
| Falcon | 2.2 | 1MB/3.2 | | $3 |
| Fastback II | 2.1 | 512KE/4.1 | | $30 |
| Fest Forms | 2.0 | 512K/3.2 | 11/90 | $25 |
| FestLabel | 2.0 | 1MB/6.0 | | $36 |
| FastTrack | 1.5 | 512KE/5.5 | | $20 |
| FexGate ★ | 1.02 | 1MB/6.0 | | Free |
| Ferrari Grand Prix ★ | 1.6 | 512K/3.2 | | $10 |
| Fetchlt | 2.0 | 512K/6.01 | | * |
| FileMaker II ★ | 1.1 | 1MB/4.2 | | * |
| FilmMeker | 2.0 | 5MB/6.0.3 | | * |
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| Financial Analysis | 3.0 | 512K/3.0 | | * |
| Findswell | 2.01 | 512KE/3.2 | 3/90 | * |
| Fontographer | 3.1 | 1MB/4 2 | 5/90 | * |
| FontShare | 2.0 | 1MB/6.0 | | Free |
| FormsProgrammer ★ | 2.03 | 1MB/6.02 | | $15 |
| FoxBase+/Mac ★ | 2.10 | 1MB/6.0 | | $75 |
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## PRODUCT UPDATES

| Product | V. | Req. | Rev. | Price |
|---|---|---|---|---|
| GatorBox | 1.5 | NA | | Free |
| GeoQuery | 2.0 | 1MB/6.0 | 10/90 | * |
| Gofer | 2.0 | 1MB/4.1 | | $25 |
| GDL | 2.0 | 1MB/5.0 | | * |
| **Grammatik Mac** | **2.0** | **1MB/5.0** | **9/90** | **Free** |
| Great Gantt | 1.2 | 1MB/6.0 | 12/90 | Free |
| Great Plains Accounting Series | 5.2 | 1MB/6.0 | | * |
| HandOff | 1.2 | 1MB/6.0 | 4/90 | * |
| Handwriting Analyst ★ | 3.1 | 512K/3.2 | 1/90 | $24.95 |
| Hard Disk Partition | 3.02 | 1MB/6.0 | | $30 |
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| Help DA | 3.0 | 1MB/6.0 | | Free |
| HFS Backup | 3.0 | 512K/3.2 | | $35 |
| HydroMac | 2.0 | 1MB/6.0 | | * |
| HyperAnimator ★ | 1.5 | 1MB/6.03 | | $29.95 |
| HyperCard ★ | 2.0 | 1MB/6.03 | | $49 |
| HyperDA ★ | 1.2 | 512K/3.2 | | $10 |
| HyperEngine Developer's Tool ★ | 1.1 | 1MB/6.03 | | Free |
| HyperLibrary | 2.0 | 1MB/5.0 | | * |
| HyperPort Chess | 2.0 | 1MB/6.0 | | $10 |
| HyperTools | 2.0 | 2MB/6.02 | | $20 |
| HyperWindows ★ | 1.2 | 1MB/6.02 | | $20 |
| Iconia ★ | 7.0 | 1MB/6.0 | | * |
| Icon-It | 2.0 | 1MB/6.02 | 9/90 | $29 |
| Igot ★ | 1.1 | 1MB/6.0 | 5/90 | Free |
| Image Grabber | 2.0 | 1MB/6.02 | | Free |
| ImageStudio | 1.5 | 1MB/6.0 | | $99 |
| ImageWriter LQ Print Driver ★ | 2.0 | 512K/3.2 | | Free |
| In-CAD | 2.0 | 2MB/6.0 | | * |
| InfoLogic Envelope ★ | 1.1c | 512KE/4.0 | | $5 |
| Insight Expert Accounts Payable | 2.2 | 1MB/6.0 | | * |
| Insight Expert Accounts Receivable | 2.2 | 1MB/6.02 | | * |
| Insight Expert General Ledger | 2.2 | 1MB/4.2 | | $99 |
| Inspiration | 2.0.5 | 1MB/4.2 | 11/90 | Free |
| Instant-Expert Plus | 3.0 | 1MB/5.0 | | Free |
| JetLink Express ★ | 1.01 | 1MB/6.0 | | Free |
| KidsTime ★ | 1.2 | 512K/3.2 | | $15 |
| KiwiEnvelopes | 3.0 | 512KE/4.1 | | $10 |
| LanguageSystems Fortran ★ | 2.1 | 1MB/6.03 | | * |
| LapLink Mac III | 3.0 | 512K/2.0 | 7/90 | * |
| LaserPaint Color II ★ | 1.02 | 1MB/6.03 | | Free |
| LetraStudio | 1.5 | 2MB/6.0 | | $45 |
| LetrTuck + | 2.0 | 512K/3.2 | | $20 |
| Lightspeed Color Layout System | 2.0 | 1MB | | * |
| Lookup | 2.0 | 1MB/6.0 | 5/90 | $15 |
| Mac86 | 2.0 | 1MB/6.02 | | $10 |
| Mac286 | 2.0 | 1MB/6.02 | | $10 |
| Mac3270 | 2.0 | 1MB/6.03 | | * |
| MacAnalyst | 2.0 | 2MB/6.0 | | $125 |
| MacArchitrion | 4.0 | 2MB/6.03 | | Free |
| MacAtlas Paint | 2.0 | 512K/3.2 | | $35 |
| MacClassAds | 4.0 | 1MB/6.0 | | * |
| MacConcept | 3.0 | 1MB/6.03 | | * |
| MacDesigner | 3.0 | 2MB/6.0 | | $125 |
| MacDraft | 2.0 | 2MB/6.0.2 | 12/90 | * |
| MacDraw II | 1.1 | 1MB/6.0 | | * |
| MacEnvelope | 5.0 | 512KE/3.2 | | $25 |
| MacEnvelope Plus | 2.0 | 512KE/3.2 | 1/90 | $50 |
| MacFalcon | 2.1 | 1MB/6.03 | | * |
| MacFlow ★ | 3.1.5 | 1MB/6.03 | | Free |
| MacFortran | 2.4 | 512K/4.2 | | * |


# You could have the pleasure of mixing and matching software for your new Mac.

| Product | V. | Req. | Rev. | Price |
|---|---|---|---|---|
| MacFortran/020 | 2.4 | 512K/4.2 | | * |
| MacFortran for MPW | 1.1 | 2MB/6.02 | | Free |
| MacInUse | 3.0 | 1MB/6.0 | | $30 |
| MacLinkPlus/Wang VS | 4.0 | 512KE/3.2 | | $45 |
| MacLotto | 2.1 | 512K/4.0 | | $10 |
| MacMainFrame 3270/CUT | 2.1 | 2.5MB/6.02 | | $100 |
| MacMoney | 3.5 | 512KE/4.0 | | $12 |
| MacPhonebook | 2.0 | 512KE/3.2 | 1/90 | * |
| MacPrint | 1.23 | 1MB/6.02 | | Free |
| MacProject II | 2.1 | 1MB/6.0 | | Free |
| MacProof ★ | 3.2.1 | 1MB/6.02 | 2/90 | $30 |
| MacRascal | 2.0 | 2MB/4.1 | | $25 |
| MacRecorder | 2.0 | 512K/3.2 | | * |
| MacroMind Director | 2.0 | 2MB/6.02 | 10/90 | $100 |
| MacSafe II | | 512KE/4.2 | 10/90 | * |
| MacScan | 1.6 | 1MB/6.0 | | $35 |
| MacSchedule | 2.0 | 1MB/6.0 | | $30 |
| MacSmarts | 4.0 | 1MB/6.0 | | * |
| MacSpin | 3.0 | 512K/4.2 | | $75 |
| MacTell | 3.5 | 512K/3.0 | | * |
| MacTerminal ★ | 2.31 | 512K/3.2 | | Free |
| MacToPic | 2.0 | 1MB/6.0 | | $25 |
| MacVision | 3.0 | 1MB/6.0.2 | | $50 |

| Product | V. | Req. | Rev. | Price |
|---|---|---|---|---|
| MacWrite II | 1.1 | 1MB/6.0 | | Free |
| Managing Your Money | 3.0 | 1MB/6.03 | 6/90 | $49.95 |
| MapGrafix | 2.0 | 4MB/6.03 | | Free |
| Maple | 4.2.1 | 1MB/6.0 | | * |
| MarcoPolo | 1.1 | 1MB/6.0 | | Free |
| MarketMaster | II+ | 1MB/6.03 | | $25 |
| MarkUp | 1.02 | 1MB/6.0 | 5/90 | Free |
| Master Tracks Pro 4 | 4.12 | 1MB/4.1 | 6/90 | $45 |
| MathCAD ★ | 2.06 | 1MB/6.0.2 | 1/90 | Free |
| MathType | 2.1 | 512K/6.02 | | * |
| Matlab | 1.2 | 1MB/3.0 | | * |
| MaxPage ★ | 1.2 | 512K/3.2 | | Free |
| McClint | 2.0 | 1MB/4.2 | | $25 |
| McCPrint | 2.0 | 512K/4.2 | | $25 |
| McMax | 2.0 | 1MB/5.0 | | * |
| Memorybank Manager | 3.0 | 1MB/6.0 | | Free |
| Mesa Graphics Plotter Utility | 1.03 | 512KE/5.0 | | * |
| Metamorphosis | 1.5 | 1MB/6.03 | 8/90 | Free |
| MGMStation ★ | 2.5 | 512KE/3.0 | | * |
| MiBAC Jazz Improvisation | 1.2.2 | 1MB/6.0 | 11/90 | Free |
| MicroPhone II | 3.0 | 512KE/4.2 | 7/90 | * |

| Product | V. | Req. | Rev. | Price |
|---|---|---|---|---|
| Microsoft Excel | 2.2 | 1MB/6.0.2 | | * |
| Microsoft File | 2.0 | 512K/3.2 | | * |
| Microsoft Mail | 2.0 | 1MB/6.02 | 1/90 | * |
| Microsoft PowerPoint | 2.01 | 1MB/6.0 | | Free |
| Microsoft Word | 4.0 | 512KE/3.2 | | * |
| Microsoft Works | 2.0 | 512K/6.0 | | * |
| MindWrite ★ | 2.1 | 512KE/4.2 | | * |
| MiniCad + | 2.0 | 1MB/6.0 | | * |
| MiniDraw | 4.0 | 512KE/4.2 | | $17 |
| MockPackage Plus Utilities | 4.4 | 512KE/3.2 | | $15 |
| Modern Artist | 2.0 | 2MB/6.02 | | $150 |
| MOMARS | 3.1 | 1MB/6.03 | | * |
| Monte Carlo | 2.0 | 1MB/6.03 | | $60 |
| More ★ | 3 | 1MB/4.1 | 12/90 | * |
| MSFL: Pro League Football | 2.0 | 1MB/6.0 | | * |
| Multi-Ad Creator | 2.2 | 2MB/6.03 | | * |
| MultiClip | 2.0 | 512K/6.02 | 8/90 | * |
| MultiLedger ★ | 1.1 | 512K/3.2 | | Free |
| MusicProse | 1.01 | 1MB/6.0 | 4/90 | Free |
| Music Publisher | 2.0.3 | 1MB/6.0 | | Free |
| MyDiskLabeler III | | 1MB/6.0 | | $25 |
| MyTimeManager | 2.0 | 1MB/6.0 | 5/90 | * |

*(continues)*


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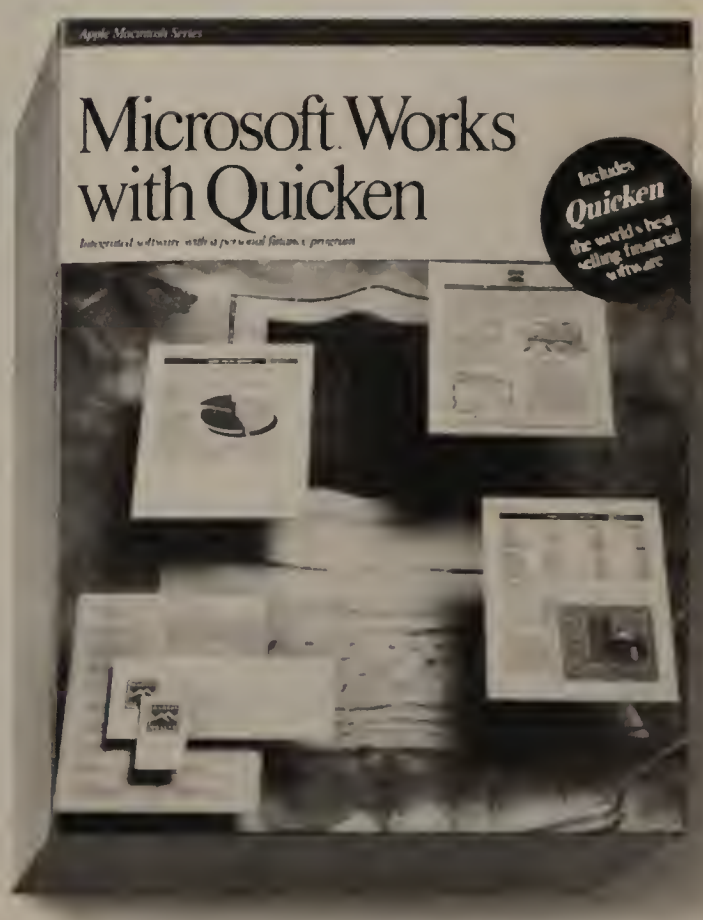


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# PRODUCT UPDATES

| Product | V. | Req. | Rev. | Price |
|---|---|---|---|---|
| NanoDisk | 2.0 | 4MB/6.04 | | Free |
| Navigate | 2.0 | 1MB/6.0 | | Free |
| Nemesis Go Master | 4.0 | 512K/4.1 | | * |
| Network DiskFit | 1.5 | 512K/4.1 | | $30 |
| The NightWatch ★ | 1.03 | 512KE/3.2 | | * |
| Nisus | 3.0 | 1MB/6.02 | | Free |
| NuPaint ★ | 1.04 | 512K/3.2 | | Free |
| NuTools | 1.2 | 1MB/6.0 | | * |
| Nutrition Stack | 2.0 | 1MB/6.02 | | $20 |
| OmniPage ★ | 2.1 | 1MB/6.02 | 2/90 | Free |
| Omnis 3 Plus/Express | 2.0 | 512KE/3.2 | | * |
| On Schedule | 2.0 | 1MB/3.0 | | * |
| P51 Musteng Flight Simulator | 2.04 | 512K/3.2 | | $10 |
| PacerLink | 5.0 | 512K/5.0 | | * |
| Panorama | 1.5 | 1MB/4.2 | | Free |
| Paper Keyboerd | 1.2 | 2MB/6.03 | | $25 |
| PEGASYS II | 3.2 | 1MB/6.03 | | Free |
| Performer Sequencer | 3.5 | 1MB/6.0 | | Free |
| Personal Golf Stets | 2.0 | 512K/3.2 | 2/90 | Free |
| Personal Phone ★ | 1.1 | 1MB/6.0 | | * |
| Personal Reference Catalog | 2.0 | 1MB/6.0 | 10/90 | $10 |
| Phonenet Liaison | 3.0 | 1MB/4.2 | | $75 |
| PhotoMac | 1.5 | 2MB/6.03 | | $75 |
| PhotoMacEdit | 1.5 | 2MB/6.03 | | $30 |
| The Phrese Thesaurus | 2.0 | 1MB/6.0 | | Free |
| PICT Detective | 2.0 | 512KE/6.0 | | $20 |
| PixelPaint | 2.0 | 2MB/4.1 | | $99 |
| PixelPaint Pro | 2.0 | 3MB/6.0.3 | | $125 |
| Plains & Simple ★ | 1.06 | 1MB/3.2 | | * |
| PostShow | 1.1 | 1MB/6.0 | | $35 |
| PowerDraw | 3.0 | 1MB/6.0 | | * |
| PowerStetion ★ | 2.5.2 | 512K/4.1 | | Free |
| PowerTools | 3.0 | 4MB/6.0 | | * |
| Practica Musica | 2.1 | 512K/3.2 | | $10 |
| Printer Interfece III | 2.0 | 512K/6.02 | | $22.50 |
| Pro-Cite ★ | 1.3 | 512K/4.1 | | * |
| Professional Composer | 2.3 | 1MB/6.03 | | Free |
| Professional Imege II | 2.0 | 1MB/6.0 | | $22 |
| The Programmer's Online Companion | 2.0 | 1MB/6.02 | | $10 |
| Prograph | 2.0 | 2MB/6.0 | 8/90 | * |
| Property Management III | | 1MB/6.0.1 | | $100 |
| PropsForms | 2.0 | 1MB/6.03 | | Free |
| Prototyper ★ | 2.01 | 1MB/4.1 | | $79 |
| Publish-It | 1.2 | 512KE/5.0 | | * |
| Publish or Perish | 5.0 | 512K/4.2 | | $10 |
| Pyro | 4.0 | 512K/4.1 | 7/90 | $15 |
| Q-Sheet A/V | 2.0 | 1MB/6.0 | 10/90 | $50 |
| QuarkXPress | 3.0 | 2MB/6.0.5 | 11/90 | $30 |
| Quicken ★ | 1.5 | 512K/5.0 | 1/90 | $30 |
| QuicKeys 2 | | 1MB/6.02 | | $49.95 |
| QuickLetter | 1.1 | 512KE/3.2 | | Free |
| QuickLock | 2.0 | 512KE/3.2 | 10/90 | Free |
| QuickMail | 2.2 | 512KE/3.2 | | $95 |
| QuickShare | 2.0 | 512KE/3.2 | | $75 |
| QuickShot ★ | 2.1 | 1MB/4.2 | | $5 |
| RagTime 3 | 3.04 | 2MB/6.0 | 8/90 | $150 |
| Read-It OCR Personal | 2.1 | 1MB/6.03 | | $29 |
| Read-It OCR Prolessional | 3.0 | 2MB/6.03 | | * |
| ReedySetGo | 4.5 | 1MB/6.0 | | * |
| Real Estate Edge | 2.0 | 1MB/6.03 | | Free |
| Rendezvous | 2.5 | 512KE/4.1 | | $15 |
| Reports ★ | 1.2 | 1MB/6.0 | | Free |
| Reteil Engine | 3.0 | 1MB/6.0 | | * |
| Seles and Market Forecesting Toolkit | 2.0 | 1MB/6.0 | | $49 |
| Seles Associate | 1.10 | 1MB/6.03 | | Free |
| SAM | 2.0 | 1MB/6.0 | 1/90 | $29.95 |
| ScanMan Model 32 | | 1MB/6.0 | 10/90 | Free |
| ScheduleMaker ★ | 3.01 | 1MB/6.0 | | $25 |
| ScreenSnap ★ | 2.2 | 1MB/4.2 | | * |
| ScriptEdit | 1.1 | 1MB/6.04 | 3/90 | * |
| Second Sight | 2.0 | 1MB/6.02 | | $33.75 |
| Sentinel | 2.2 | 1MB/6.0 | | $30 |
| Shenghai | 2.0 | 1MB/6.02 | 2/90 | $13 |
| Shortcut | 1.5 | 1MB/6.0 | 3/90 | Free |
| SimMac | 3.0 | 1MB/6.02 | | Free |
| SimpleSpan | 2.5 | 512K/3.2 | | * |
| Smart Alarms & Appointment Diaries | 3.1 | 1MB/6.02 | 12/90 | $25 |
| Smart Alarms & Multi-User Appointment Diaries | 3.01 | 1MB/6.02 | 12/90 | * |
| SmartForm Assistant | 1.1 | 1MB/6.0 | | Free |
| SmertForm Designer | 1.1 | 1MB/6.0 | | Free |
| SmertScrap & The Clipper | 2.0 | 1MB/6.03 | | $20 |
| Snap ★ | 3.1 | 1MB/3.0 | | * |
| SoftPC ★ | 1.3 | 2MB/6.0 | | * |
| Sound Designer Universal ★ | 1.5 | 512K/6.03 | | $45 |
| Spelling Coach Professional | 3.1 | 512KE/4.2 | | * |
| Spellswell ★ | 2.2 | 512K/3.2 | 5/90 | $20 |
| Spinneker Plus | 2.0 | 2MB/6.0 | | $45 |
| Springboerd Publisher | 2.0 | 1MB/6.0 | | * |
| Stepping Out II | 2.0 | 1MB/4.1 | | Free |
| StickyBusiness | 1.06 | 512KE/6.03 | | Free |
| Still Light | 3.0 | 1MB/6.0 | | Free |
| StrateVision 3d | 2.0 | 2MB/6.03 | 4/90 | $99 |
| Suitcase II | 1.2.6 | 512KE/4.1 | | $25 |
| Super 3D | 2.1 | 512KE/6.02 | | Free |
| SuperANOVA | 1.1 | 1MB/6.02 | 5/90 | Free |
| SuperGlue II with GlueNotes | 2.1 | 1MB/6.0 | 1/90 | * |
| SuperLaserSpool | 2.0.2 | 1MB/6.0 | | $30 |
| SuperPaint | 2.0 | 1MB/6.02 | | $50 |
| SuperSpool | 5.0 | 512K/4.1 | | $30 |
| Sybil | 2.0 | 1MB/6.0 | 11/90 | * |
| Synchronicity | 2.5 | 512KE/3.2 | | $10 |
| Systat | 5.0 | 4MB/6.0 | | $190 |
| Teacher's Rollbook ★ | 2.2 | 512K/3.2 | | $17.95 |
| Tempo II | 1.02 | 1MB/4.2 | | * |
| Tempo+ Tools ★ | 1.1 | 1MB/4.2 | | * |
| Ternary Plot | 3.0 | 512K/3.2 | | * |
| TextPert ★ | 3.01 | 1MB/6.0 | | Free |
| TextScan | 3.04 | 1MB/6.0 | | $69.95 |
| TGRAF-07/Mac | 2.0 | 2MB/6.0 | | * |
| Think C | 4.0 | 1MB/5.0 | 2/90 | * |
| Think Pascal | 3.0 | 1MB/5.0 | 11/90 | $69 |
| ThunderWorks | 1.0.3 | 1MB/6.0.2 | | $69 |
| Timbuktu | 3.1 | 1MB/4.1 | 10/90 | * |
| Timbuktu/Remote | 2.0 | 1MB/4.1 | 3/90 | * |
| TimeMinder | 2.0 | 1MB/4.2 | | $50 |
| Timeslips III | 2.0 | 1MB/6.02 | 2/90 | * |
| TML Pascal II | 3.0 | 1MB/5.0 | | $79.95 |
| TMON ★ | 2.8.4 | 512K/4.0 | | * |
| TOPS/Mac | 3.0 | 512K/3.2 | | * |
| Trapeze ★ | 2.1 | 1MB/6.0 | | $35 |
| TrueBASIC ★ | 2.02 | 1MB/6.0 | | Free |
| TrueForm ★ | 1.1 | 1MB/6.2 | 4/90 | Free |
| TurboCASE | 2.0 | 1MB/6.0 | | $25 |
| Turbosynth | 2.0 | 1MB/6.03 | | $35 |
| Typeface Library | 1.5 | 1MB/6.03 | | * |
| TypeStyler | 1.5 | 1MB/4.1 | 7/90 | * |
| UNITize ★ | 1.3 | 512KE/3.2 | | $20 |
| UpBeat | 2.01 | 1MB/6.0 | 8/90 | $75 |
| VersaCAD/ Macintosh Edition ★ | 2.11 | 1MB/6.0 | | Free |
| Vietnam War | 2.0 | 1MB/6.0 | | * |
| Virex | 2.8 | 1MB/4.2 | 1/90 | $15 |
| Virtual 2.0 for 030 | 2.03 | 1MB/4.2 | | Free |
| Virtual 2.0 for Mac II | 2.03 | 1MB/4.2 | | Free |
| Virtual 2.0 for Mac Plus | 2.02 | 1MB/4.2 | | Free |
| Vision | 1.1 | 1MB/6.03 | | Free |
| VMacS | 2.0 | 1MB/6.0 | | $25 |
| Voyager | 1.2 | 1MB/6.0 | 4/90 | * |
| Wall Street Investor | 3.0 | 1MB/5.0 | | $150 |
| White Knight II | 11.6 | 1MB/6.02 | 7/90 | $35 |
| Wild Things ★ | 1.1 | 1MB/6.0 | | Free |
| WillMaker | 4.0 | 512KE/4.2 | | $18.50 |
| Wingz ★ | 1.1 | 1MB/6.0 | | Free |
| Word Finder | 2.0 | 512K/3.2 | | * |
| WordPerfect for the Macintosh | 2.0 | 1MB/4.2 | | * |
| WorksPlus Command | 2.0 | 2MB/6.03 | 1/90 | $35 |
| WorksPlus Spell | 2.0 | 1MB/6.03 | 1/90 | $35 |
| WriteNow | 2.2 | 512K/4.2 | 9/90 | $49 |

To have products listed in this section, send upgraded software, an outline of changes since the previous release (indicate if it's a maintenance upgrade), upgrade price, minimum RAM and system software, suggested retail price, company name, mailing address, and phone number to *Updates, Macworld,* 501 Second St., San Francisco, CA 94107

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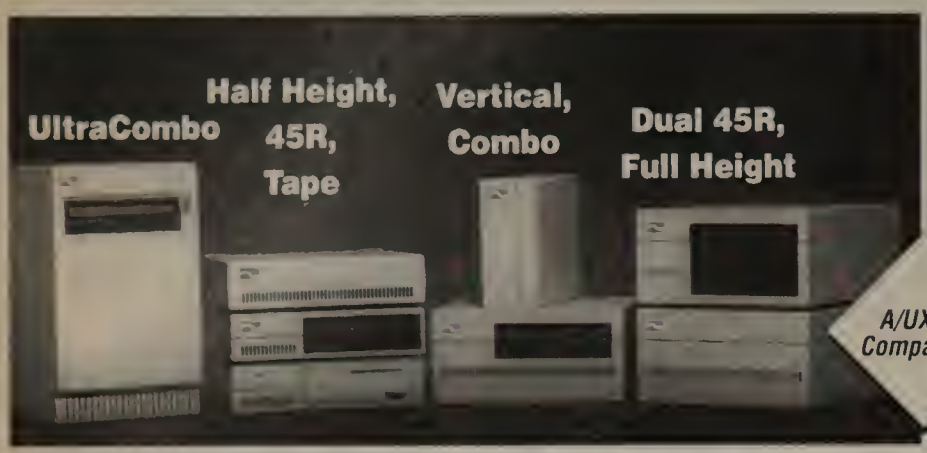


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|---|---|---|---|---|
| 40 | 18ms (12ms*) | 339 | 439 | 469 |
| 52 | 17ms (LPS) | 399 | 499 | 529 |
| 80 | 18ms (12ms*) | 509 | 609 | 639 |
| 105 | 18ms (12ms*) | 569 | 669 | 699 |
| 105 | 17ms (LPS) | 619 | 719 | 749 |
| 120 | <15ms | 669 | 769 | 799 |
| 170 | <15ms | 799 | 899 | 929 |
| 210 | <15ms | 969 | 1069 | 1099 |

### •Seagate MacWren (CDC/IMPRIMIS)

| | |
|---|---|
| 173 | 18ms |
| 300 | 16.5ms |
| 330 | 11ms Runner |
| 425 | 16ms 1/2 Ht. |
| 600 | 16.5ms |
| 650 | 15.5ms |
| 1000 | 15ms |

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### •Syquest, Tape, DAT, Optical

| | | |
|---|---|---|
| 45R (Syquest) | 599 | 629 |
| 45DR (Dual Syquest) | | 1199 |
| 60t (Teac) w/Retrospect | | 599 |
| 150t (Teac) w/Retrospect | | 699 |
| DATadrive™ 1.3GB WangDAT, w/Retrospect | | 2049 |
| OptiDisk 650™ (Sony) w/cart. & Retrospect | | Call |
| 2.3GB 8mm Tape (Exabyte) w/cart. & Retrospect | | Call |

### •Combo Drives

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170/DAT
210/DAT
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### •Media

| | |
|---|---|
| Teac CT600H | 17 |
| Teac CT600N | 24 |
| Syquest SQ400 | 78 |
| 4mm DAT Tape | 19 |
| Sony Opt. Cart. | 225 |

### •SIMMs & Memory

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| Mac SIMMs (1, 4mb) | Call |
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*Memory* Third Wave utilizes the latest surface mount manufacturing technology to bring you economically priced SIMMs and memory products. Since we have complete control over the manufacturing process, you can count on our quality. Unlike other suppliers, we are manufacturers, not just box stuffers.

### •Performance Add-ons

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| DayStar FastCache IIci | 299 |
| DayStar Accelerators | Call |
| 68851 PMMU w/Virtual | 189 |

*We* sell many performance products but don't have room to list them all. Please call for more information.

### •Video & Monitors

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| Seiko Trinitron 14" | 589 |
| Sony 1304 14" | 699 |
| Ikegami Trinitron 19" | 2299 |

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# WHERE TO BUY

## A Guide to Products Featured in This Issue

This listing provides companies and phone numbers for products mentioned in this issue. Allow several weeks for responses to reader service card inquiries. Asterisks indicate vendors who prefer to be contacted by phone.

Reader Service

701 **3+Mail for Macintosh** 3Com Corp.; 408/562-6400, 800/638-3266.

702 **3+Share** 3Com Corp.; 408/562-6400, 800/638-3266.

703 **4th Dimension** ACIUS; 408/252-4444, 800/538-8157.

**A**

704 **Adobe Font Software** Downloader Adobe Systems; 415/961-4400, 800/833-6687.

705 **Adobe Type Manager, Adobe Type Reunion** Adobe Systems; 415/961-4400, 800/833-6687.

707 **Alarming Events** CE Software; 515/224-1995.

708 **allShare** Everyware; 416/569-3568, 800/668-6977.

709 **Apple II Workstation Card** Apple Computer; 408/996-1010.

710 **AppleShare FileServer 2.0** Apple Computer; 408/996-1010.

711 **AppleTalk Internet Router** Apple Computer; 408/996-1010.

**B**

712 **BelTalk** Belkin Components; 213/515-7585, 800/223-5546.

713 **Bomber** Inline Design; 203/364-0063.

714 **BroadTalk to LocalTalk Gateway** Cactus Computer; 214/416-0525, 619/490-5050.

Reader Service

**C**

715 **Carbon Copy Mac** Microcom; 617/551-1000, 800/822-8224.

716 **cc:Mail LAN Package for Macintosh** cc:Mail; 415/961-8800, 800/448-2500.

717 **CompuNet** Trimar USA; 212/645-7008, 800/872-4454.

718 **CompuServe Information Manager** CompuServe; 614/457-8600, 800/348-8199.

719 **CompuServe Navigator** CompuServe; 614/457-8600, 800/348-8199.

720 **CompuTalk, CompuTalk Plus** AESP; 305/944-7710, 800/446-2377.

722 **ComTalk** APT Communications; 301/831-1182, 800/842-0626.

723 **C-Server** Solana Electronics; 619/490-5050.

**D**

724 **DaynaTalk** Dayna Communications; 801/531-0203.

725 **DaynaTalk MC Card** Dayna Communications; 801/531-0203.

726 **DaynaTalk PC Card** Dayna Communications; 801/531-0203.

727 **Desk** Zedcor; 602/881-8101, 800/482-4567.

729 **DL/2** Dayna Communications; 801/531-0203.

730 **DL/2000** Dayna Communications; 801/531-0203.

731 **DocuComp** Advanced Software; 408/733-0745, 800/346-5392.

732 **DOS Connect** Shiva Corp.; 617/864-8500, 800/458-3550.

733 **DOS Dial-In** Shiva Corp.; 617/864-8500, 800/458-3550.

Reader Service

**E**

734 **EasyShare** Shirt-Pocket Software; 602/966-7667.

735 **EtherGate** Shiva Corp.; 617/864-8500, 800/458-3550.

* **Ether-Route** Compatible Systems Corp.; 303/444-9532, 800/356-0283.

**F**

737 **FastPast** Shiva Corp.; 617/864-8500, 800/458-3550.

738 **FaxGate Plus** Solutions; 802/865-9220.

739 **FlashBox DB-9, FlashBox DIN-8** Sitka; 415/769-9669, 800/445-8677.

741 **FlashCard** Sitka; 415/769-9669, 800/445-8677.

742 **FoxBase+/Mac** Fox Software; 419/874-0162.

**G**

743 **GatorBox** Cayman Systems; 617/494-1999.

744 **Great Gantt** Varcon Systems; 619/563-6700.

**H**

745 **Hayes Connect** Hayes Microcomputer Products; 404/441-1617.

746 **Hercules Network Card Plus** Hercules Computer Technology; 415/540-6000, 800/532-0600.

747 **H-Server** Solana Electronics; 619/490-5050.

**I**

748 **if:x Forms Designer** SoftView; 805/385-5000, 800/622-6829.

Reader Service

749 **ImageWriter II/LQ LocalTalk Option** Apple Computer; 408/996-1010.

750 **InBox** Sitka; 415/769-9669, 800/445-8677.

751 **In/Out** CE Software; 515/224-1995.

752 **Inside Information** Microlytics; 716/248-9150, 800/828-6293.

753 **InterBridge** Hayes Microcomputer Products; 404/441-1617.

* **InterTalk 2** P-Ingenierie; 415/896-0708.

754 **IPT230/A AppleTalk Interface Card** Information Presentation Technology; 818/347-7791, 800/233-9993.

755 **I-Server** Solana Electronics; 619/490-5050.

756 **Ishido** Accolade; 408/985-1700.

**L**

757 **LANstar AppleTalk Bridge** Northern Telecom; 408/988-5550, 800/328-8800.

758 **LapLink Mac III Network Pac** Traveling Software; 206/483-8088, 800/662-2652.

759 **LaserSafe** Iomega Corp.; 801/778-1000, 800/456-5522.

760 **LaserScript** Abaton, a Subsidiary of Everex Systems; 415/683-2226, 800/444-5321.

761 **LaserWriter Font Utility** Bitstream; 617/497-6222.

762 **Legends of the Lost Realm** Avalon Hill; 800/999-3222.

763 **Liaison** Infosphere; 503/226-3620,

*(continues)*

Reader Service

800/445-7085.

764 **LocalTalk** Apple Computer; 408/996-1010.

765 **LocalTalk Connector Kit DIN 8** Apple Computer; 408/996-1010.

766 **LocalTalk PC Card** Apple Computer; 408/996-1010.

767 **LT200 Connection MC, LT200 Connection PC** DayStar Digital; 404/967-2077, 800/962-2077.

M

769 **Mac CPUs and Peripherals** Apple Computer; 408/996-1010.

770 **MacDraft** Innovative Data Design; 415/680-6818.

771 **MacGateWay AT** The Wollongong Group; 415/962-7100, 800/962-8649.

773 **MacIrmaLan 802.2 Gateway Server** Digital Communications Associates; 404/442-4000, 800/241-4762.

774 **MacIrmaLan SDLC Gateway2 Server** Digital Communications Associates; 404/442-4000, 800/241-4762.

776 **MacMainFrame** Token Ring Gateway Avatar Corp.; 508/435-6872, 800/282-3270.

777 **MacMainFrame SDLC Gateway** Avatar Corp.; 508/435-6872, 800/282-3270.

778 **MacSki** XOR Corp.; 612/941-0906, 800/635-2425.

779 **Magic Typist** Tactic Software; 305/378-4110, 800/344-4818.

780 **MarkUp** Mainstay; 818/991-6540.

781 **MasterJuggler** AlSoft; 713/353-4090.

782 **MaxWay 500** Tri-Data Systems; 408/727-3270, 800/874-3282.

• **Microsoft Mail** Microsoft Corp.; 206/882-8080, 800/426-9400.

783 **ModuNet** Data Spec; 818/772-9977.

784 **ModuNet EZ** Data Spec; 818/772-9977.

785 **More** Symantec Corp.; 408/253-9600, 800/441-7234.

786 **MultiGate 2000** Network Resources Corp.; 408/263-8100.

N

787 **NetAxcess** Andrew KMW Systems; 512/338-3000, 800/531-5167.

788 **NetBridge** Shiva Corp.; 617/864-8500, 800/458-3550.

789 **NetModem V.32** Shiva Corp.; 617/864-8500, 800/458-3550.

790 **NetModem V2400** Shiva Corp.; 617/864-8500, 800/458-3550.

791 **NetSerial** Shiva Corp.; 617/864-8500, 800/458-3550.

792 **NetWare** Novell; 801/379-5900, 800/526-5463.

793 **NetWay 1000** Tri-Data Systems; 408/727-3270, 800/874-3282.

794 **NetWay 2000** Tri-Data Systems; 408/727-3270, 800/874-3282.

795 **Network Bundle for the Macintosh** Sitka; 415/769-9669, 800/445-8677.

796 **Newport Data Modems, Newport Fax/Data Modems** Xecom; 408/945-6640.

O

798 **OrchidFax** Orchid Technology; 415/683-0373, 800/767-2443.

P

799 **Personal Server Network** Information Presentation Technologies; 818/347-7791, 800/233-9993.

800 **PhoneNet Connector** Farallon Computing; 415/596-9100.

801 **PhoneNet Liaison** Farallon Computing; 415/596-9100.

802 **PhoneNet Repeater** Farallon Computing; 415/596-9100.

803 **PhoneNet StarConnector** Farallon Computing; 415/596-9100.

804 **PhoneNet StarController** Farallon Computing; 415/596-9100.

805 **PhotoLink** Photonics Corp.; 408/370-3033, 800/628-3033.

806 **Pipe Dream** Electronic Arts; 415/571-7171, 800/245-4525.

• **Public Folder** Claris Corp.; 408/987-7000.

807 **Pyware Music Writer** Pygraphics; 817/481-7536, 800/222-7536.

Q

808 **Q-Talk** Laser Connection; 205/633-7223.

809 **QuadPort II** Xecom; 408/945-6640.

810 **QuickMail** CE Software; 515/224-1995.

811 **QuickNet** Infotek; 516/289-9682.

812 **QuikNet** Belkin Components; 213/515-7585, 800/223-5546.

R

813 **Repeater** Sitka; 415/769-9669, 800/445-8677.

814 **R-Server** Solana Electronics; 619/490-5050.

S

815 **Send Express** Gizmo Technologies; 415/623-7899.

816 **Sky Shadow** Casady & Greene; 408/624-8716, 800/359-4920.

817 **Smart Alarms with Appointment Diary** JAM Software; 415/663-1041.

818 **Smartmodem 2400M** Hayes Microcomputer Products; 404/441-1617.

819 **Smartmodem 9600** Hayes Microcomputer Products; 404/441-1617.

820 **SpeedGuard Collision Filter** Dayna Communications; 801/531-0203.

821 **SpeedTalk** EMAC, a division of Everex Systems; 415/683-2222, 800/821-0806.

822 **StarBurst** Cactus Computer; 214/416-0525.

823 **Stratego** Accolade; 408/985-1700.

• **Stylist** SNA; 609/799-9605, 800/628-6442.

824 **Suitcase II** Fifth Generation Systems; 504/291-7221, 800/873-4384.

825 **SwiftNotes** Sterling Swift Software; 512/280-2431.

826 **SyncRouter** Engage Communication; 408/688-1021.

T

827 **Talking Moose** Baseline Publishing; 901/682-9676, 800/926-9676.

828 **TeleBridge** Shiva Corp.; 617/864-8500, 800/458-3550.

829 **Teleconnector** Sitka; 415/769-9669, 800/445-8677.

830 **TeleFinder** Spider Island Software; 714/669-9260.

831 **Timbuktu** Farallon Computing; 415/596-9100.

832 **Timbuktu/Remote** Farallon Computing; 415/596-9100.

833 **TurboBridge** Nuvotech; 415/331-7815, 800/232-9922.

834 **TurboNet** Nuvotech; 415/331-7815, 800/232-9922.

835 **TurboNet ST** Nuvotech; 415/331-7815, 800/232-9922.

836 **TurboStar** Nuvotech; 415/331-7815, 800/232-9922.

W

837 **Where in Time Is Carmen Sandiego** Brøderbund Software; 415/492-3200, 800/521-6263.

838 **Word for Word Mac** The Software Toolworks; 415/883-3000. ■

Public domain software, freeware, and shareware are available through online information services; user groups (call 800/538-9696 ext. 500 for information on a local user group); or mail-order clearinghouses such as EDUCORP (800/843-9497, 619/536-9999), or the Public Domain Exchange (800/331-8125, 408/496-0624 in California)

*(continues on page 367)*

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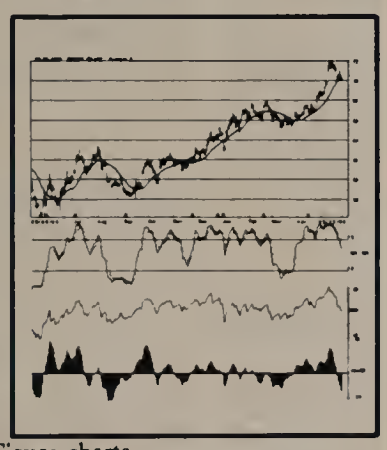

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001 51000K IBM      DL/1      001
A & M RECORDS          LOS ANGELES   CA90028   2134480037C365200275
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3350        01610298058IBM 3420        00813298100IBM 4245        002
A & M RECORDS          LOS ANGELES   CA90028   2134480037C365200275
```

*The sample above shows fixed length fields and fixed length records that are common in some mainframe files. That means you can not simply tell your conversion program to drop in tab or comma delimited spaces at the end of the text in each field. For most programs converting this would be complete chaos. And that's without eliminating the duplications and extracting just the information you want.*

*Nisus 3.0's word processing language makes short work out of the formatting, extracting, and elimination process. Note the results below, including the bold face and upper and lower case changes. We are not suggesting you buy Nisus only for its ability to convert mainframe files, but with this kind of power, imagine what else you can do.*

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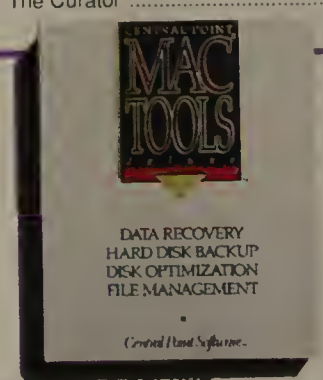


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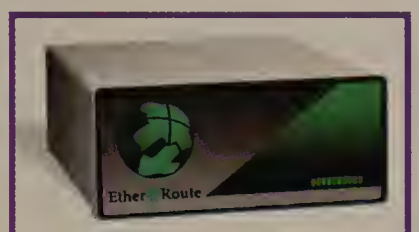


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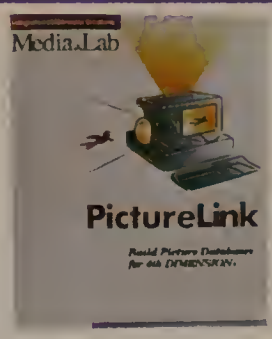


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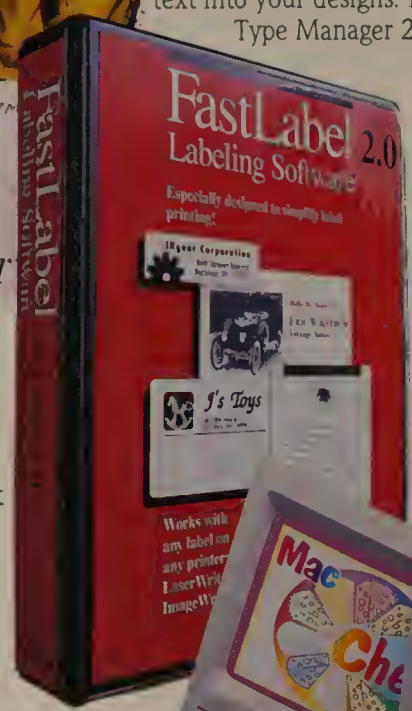


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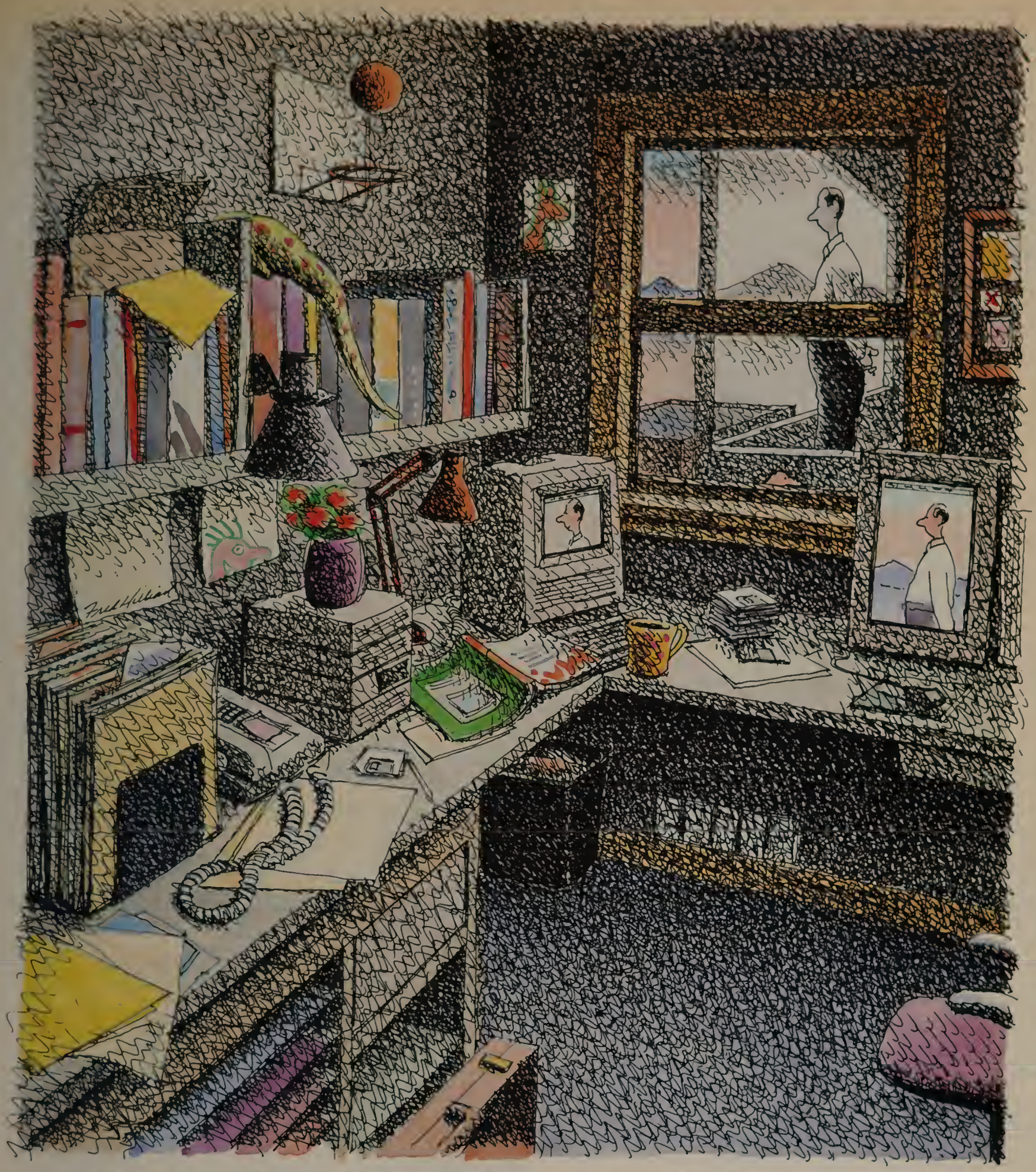

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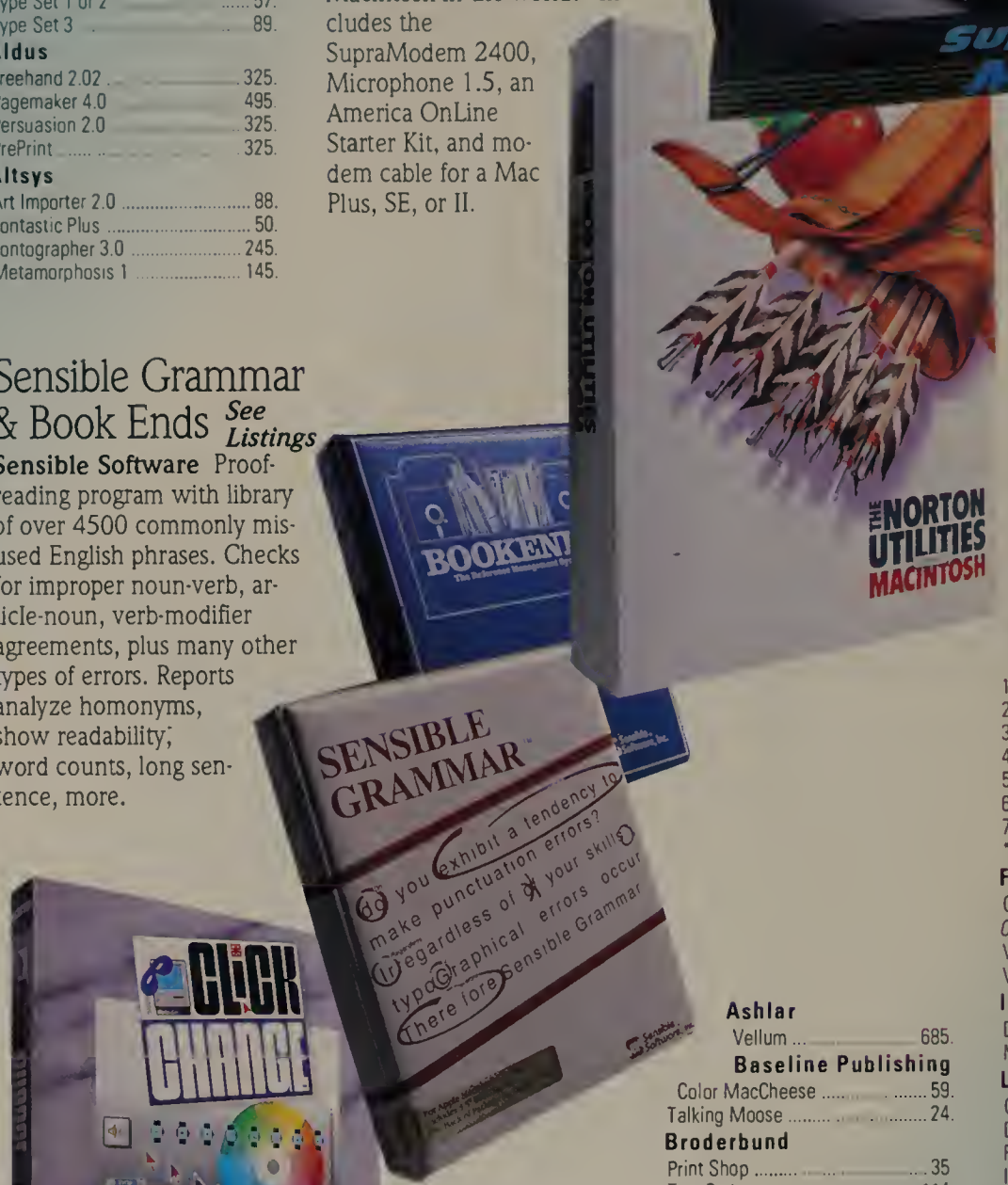


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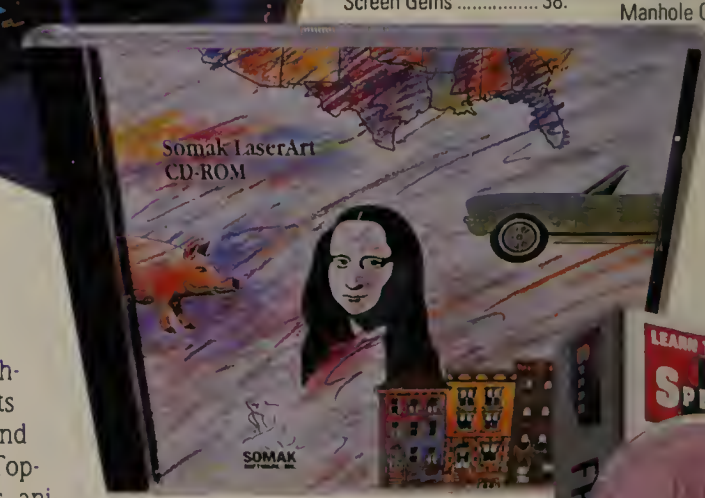


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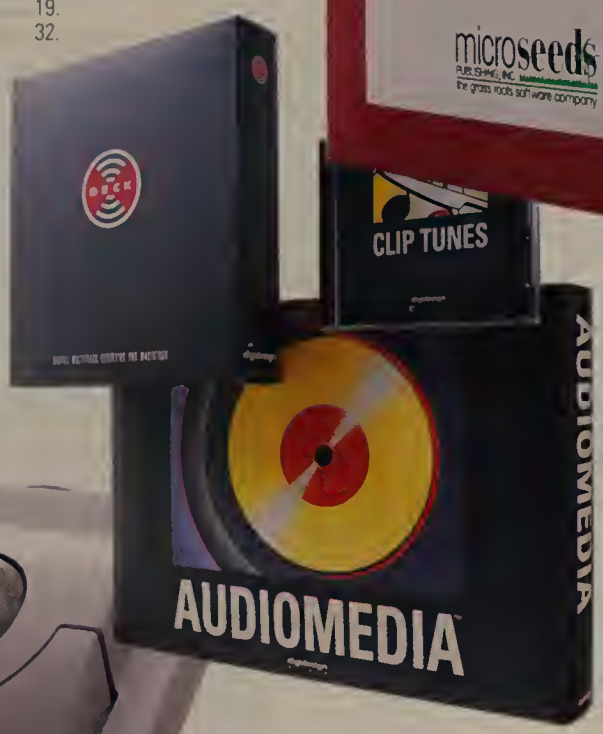


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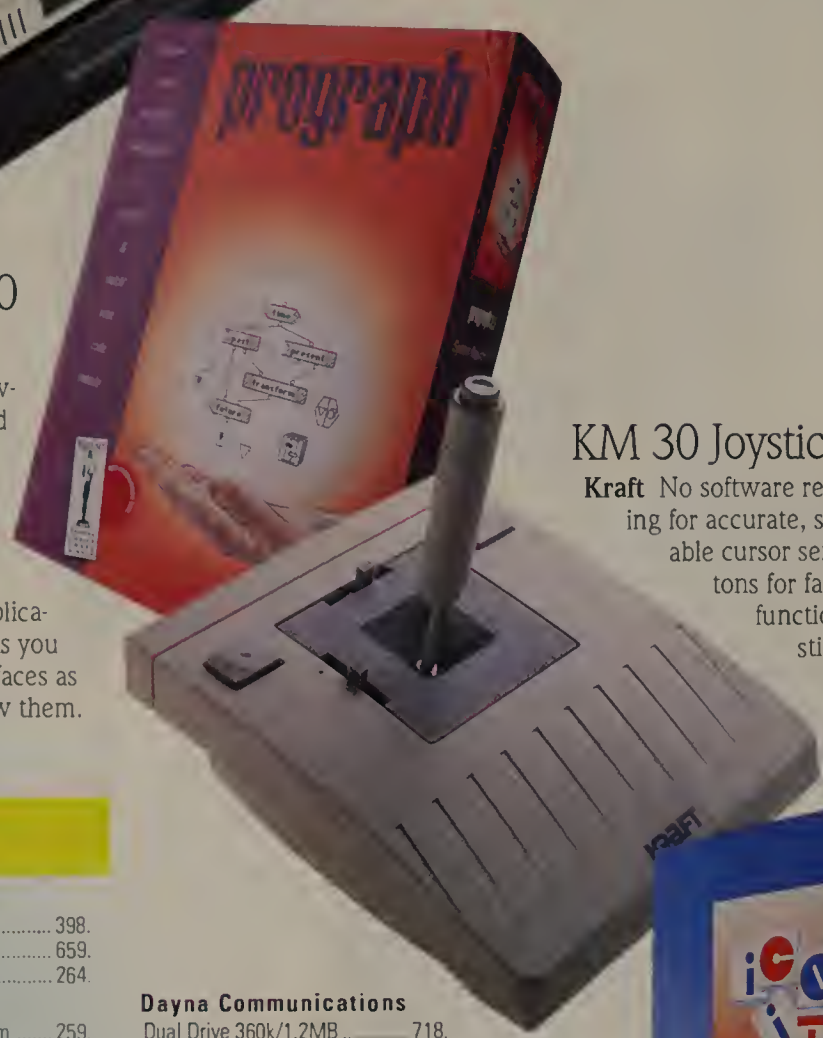


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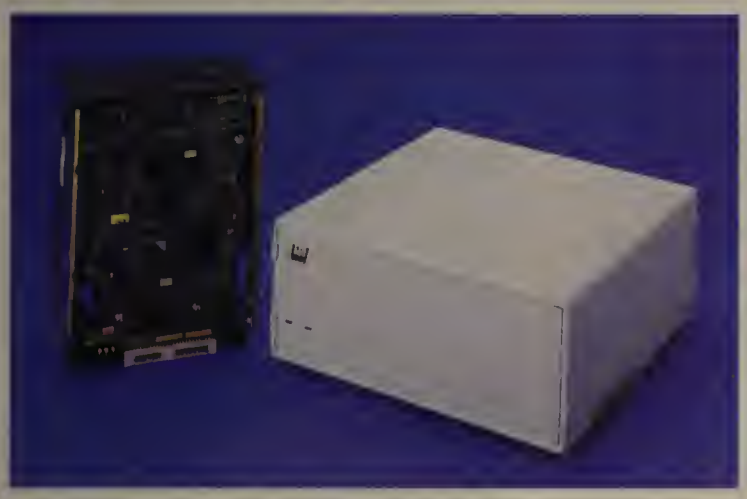

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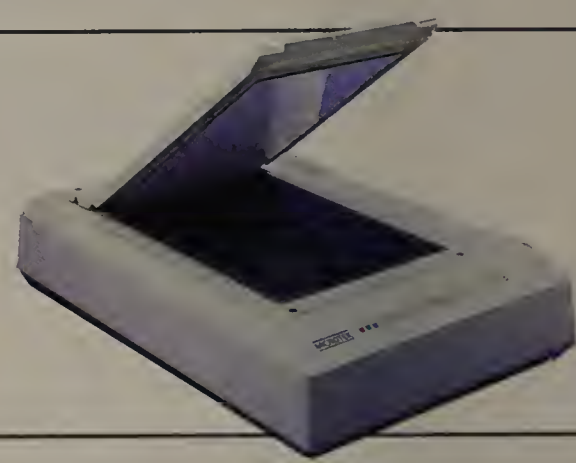

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| 30 Megabyte External | $378 |
| 45 Megabyte External | $438 |
| 60 Megabyte External | $488 |
| 80 Megabyte External | $538 |
| 100 Megabyte External | $788 |

### CMS External

| | |
|---|---|
| MacStack 20 Megabyte...32 ms | $348 |
| MacStack 30 Megabyte...28 ms | $398 |
| MacStack 40 Megabyte...25 ms | $428 |
| MacStack 45 Megabyte...28 ms | $468 |
| MacStack 60 Megabyte...38 ms | $528 |
| MacStack 80 Megabyte...28 ms | $598 |
| MacStack 100 Megabyte...25 ms | $898 |
| 45 Megabyte Removable | $798 |
| CMS Internal Hard Drives Available | Call |

### NEC CD ROM

| | |
|---|---|
| CDR-35 | $398 |

### Tape Back-up Systems

| | |
|---|---|
| CMS TS-60....60 Megabyte | $648 |
| CMS TS-150...150 Megabyte | $798 |

### External 800K Drive

| | |
|---|---|
| Cutting Edge | $149 |

### Scanners

| | |
|---|---|
| Complete PC Page Scanner | $749 |
| EPSON 300C | Call |
| Hewlett Packard ScanJet Plus | $1598 |
| Logitech Hand Held | $358 |
| Microteck Series | Call |

### Sharp

| | |
|---|---|
| JX 100 Hand Held | $699 |
| JX 300 Color | $2999 |
| JX 450 Color | $4999 |
| IEEE Interface | $429 |

### Modems

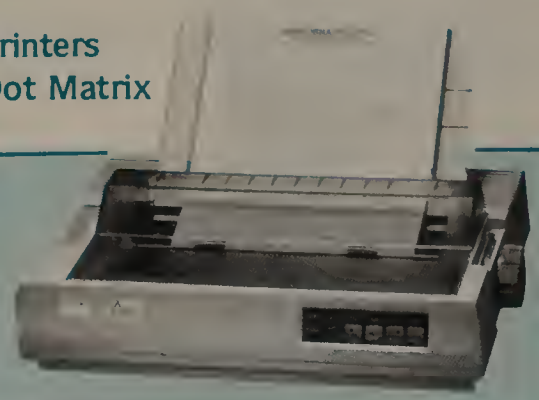
| | |
|---|---|
| External 2400 Baud | $99 |
| Internal 2400 Baud | $199 |

### Dove

| | |
|---|---|
| Dove FAX | $275 |
| MacSnap Plus 2 | $98 |
| MacSnap 2/SE | $98 |
| Marathon 030 upgrade | $448 |

## Printers

### Dot Matrix



Seikosha ..... $199
Imagewriter/Mac Compatible

### EPSON Letter Quality Printers

| | |
|---|---|
| LQ-510.....(24 PIN) | $299 |
| LQ-850, LQ-950, LQ-1050, LQ-2550 | Call |
| EPSON Printer Software | $125 |

### Kodak InkJet

| | |
|---|---|
| Portable M150 | $479 |

H.P. Deskwriter
300 d.p.i. ..... $699

### Laser Printers

| | |
|---|---|
| EPSON EPL-6000 Laser | $849 |
| 2 Megabyte Memory Upgrade | $298 |
| Freedom of the Press PostScript for EPSON | $148 |
| TI MicroLaser PS-35 with AppleTalk | $2048 |
| GCC Technologies Business Laser..(Demo) | $1998 |
| Hewlett Packard LaserJet IIP Laser | $1089 |
| Hewlett Packard LaserJet III Laser | $1698 |
| Pacific Data MacPage | $448 |

## SIMMS

| | |
|---|---|
| 1 Megabyte | $68 |
| Apple Portable | $349 |

## Monitors

### E-Machines

| | |
|---|---|
| Big Picture 17" | $114 |
| Quickview Z-21" | $174 |
| Quickview Z-21 IQ (Gray Scale) | $229 |
| ColorPage 15" | $129 |
| ColorPage T-16"/TX-16 | $2598/$309 |
| T-19" | $409 |

### Magnavox 14" Color Display

| | |
|---|---|
| 640 x 480 Resolution | $48 |

### NEC MacSync 14" Color Display

| | |
|---|---|
| 640 x 480 Resolution | $48 |

### Panasonic 14" Color Display

| | |
|---|---|
| PanaSync 1024 x 768 Resolution | $46 |

### Radius

| | |
|---|---|
| Pivot Display | $139 |
| Two Page Display 19" | $159 |
| Two Page Display 21" | $179 |

### Raster Ops

| | |
|---|---|
| Clearvue Mac II Series | $114 |
| Clearvue SE | $139 |
| Clearvue GS | $159 |

### Seiko

| | |
|---|---|
| 14" Color Monitor | $58 |

### Sony 1304 Color Display

| | |
|---|---|
| 1024 x 768 Resolution | $69 |

### Sigma Design Monitors — Ca

### SuperMac Monitors & Boards — Ca

No RAD - Radiation Shields — From $99

## Accelerators/Video Cards

### DayStar Digital

| | |
|---|---|
| FastCache II ci | $64 |
| Powercard 030, 25, 33, 40, 50 MHz | Ca |

### Micron Video Card

| | |
|---|---|
| XCeed 8 BIT | $34 |
| XCeed 8 BIT 19" Displays | $59 |

### Raster Ops 264/II — $59

| | |
|---|---|
| Other Models | Ca |

## Keyboards

| | |
|---|---|
| Keytronics MacPro | $11 |
| DataDesk Mac 101 | $12 |
| DataDesk Switchboard | Ca |

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| Mbytes | Mechanism | Access | Int. | Ext. |
|---|---|---|---|---|
| 20 | Seagate | 28ms | $259 | $295 |
| 30 | Seagate | 28 | 289 | 319 |
| 40 | Quantum | 19 | 349 | 409 |
| 45 | Seagate | 28 | 319 | 369 |
| 60 | Seagate | 28 | NA | 399 |
| 80 | Seagate | 28 | NA | 439 |
| 80 | Quantum* | 19 | 499 | 549 |
| 105 | Quantum* | 19 | 569 | 649 |
| 105 | Toshiba | 20 | 549 | 619 |
| 180 | Fujitsu* | 25 | NA | 849 |
| 200 | Maxtor | 15 | 929 | 979 |
| 210 | Quantum* | 16 | 949 | 999 |
| 320(HH) | Micropolis | 14 | NA | 1499 |
| 320(FH) | Imprimis | 16 | NA | 1499 |
| 600(FH) | Imprimis | 16 | NA | 1999 |
| 630(FH) | Fujitsu | 16 | NA | 1949 |
| 660(FH) | Micropolis | 16 | NA | 2099 |
| **1050(FH)** | **Imprimis** | **16** | **NA** | **2999** |
| 1050(FH) | Micropolis | 14 | NA | 3299 |

**Removable SyQuest*** $589
25ms Includes 45Mb cartridge Extra Cartridge $79

**Memory Upgrades**
1Mb* (1x8-80ns) $49
4Mb* (4x8-80ns) $299
For MacII, IIcx, IIci, SE, SE/30 & Plus

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*International*

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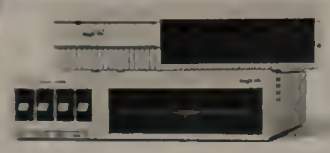
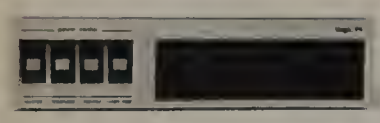
## Storage



**Magic 45 MB Removable** Syquest Mech. $499
**Syquest Cartridges**.....with purchase of drive $69
Magic CD ROM - Toshiba Mech .....$749
60mb Tape Backup w/ Retrospect.....$695
150 mb Tape Backup w/Retrospect.....$795
1.2 gig Tape Backup w/Retrospect.....$2995
2.4 gig Tape Backup w/Retrospect.....$3495

**Ask about our new replacement warranty!**



MagicTape 60 ½
MacUser, December 1989

## Video

**MacProducts USA carries a complete selection of video solutions for your Macintosh System**

19" B&W Two Page Monitor, 72 DPI 78 Hz Refresh Rate, With Video Card.....$899
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24-bit Card & 14" NEC MacSync.....$798
8-bit Card & 19" Triniton.....$2799
24-bit Card & 19" Triniton.....$4599

## Memory

**1 MB SIMMs $44**
70/80/100 ns.....
4 MB SIMMs.....$269
4 MB fx SIMMs.....$269
1-8 MB Upgrade.....call
1 MB fx SIMMs.....$49
Magic SCSI.....$69
128k-512k Upgrade.....$149
128k-1 MB Upgrade.....$295
512k-1 MB Upgrade.....$149
512k-2 MB Upgrade.....$299
512k-4 MB Upgrade.....$399
800k Drive & ROMs.....$299
**IIfx Upgrade!**.....$2399
5 Mb Portable RAM.....$1595

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| Quantum | Internal Drive | External Drive |
|---|---|---|
| 40 MB | 279 | 399 |
| 50 MB 1" Minidrive! | 299 | 435 |
| 80 MB | 469 | 569 |
| 105 MB | 499 | 599 |
| 170 MB | 749 | 859 |
| 210 MB | 899 | 999 |

**Internal Kit $29**

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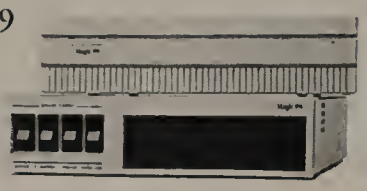
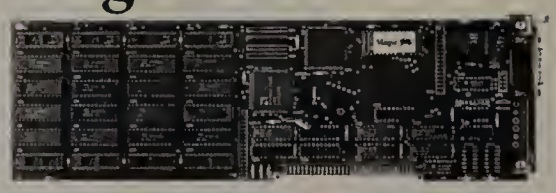


## Magic Color Cards



**Magic makes a complete line of color cards for your Macintosh that are all 100% Apple compatible.**

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Magic 8-bit Color Card for SE/30.....$329
Magic 24-bit Color Card 13" & 14".....$349
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**MacRAM Portable**
8 Mb RAM Expansion Card
**$3415**

**Quadralink**
Nu-Bus expansion card -add 4 additional serial ports to a Mac
**$219**

## HARDWARE

### Accelerators

| | |
|---|---|
| Daystar 25mhz 030 II, IIx | 1099 |
| Daystar 25mhz 030 IIcx | 1469 |
| Daystar 33mhz 030 II, IIx | 1459 |
| Daystar 33mhz 030 IIcx | 1829 |
| Daystar 40mhz 030 II, IIx | 1669 |
| Daystar 40mhz 030 IIcx | 1969 |
| Daystar 50mhz 030 II, IIx | 2199 |
| Daystar 50mhz 030 IIcx | 2559 |
| Daystar FastCache IIci | 299 |
| Daystar SCSI Powercard 0 MB | 1133 |
| Daystar SCSI Powercard 1 MB | 1308 |
| MacCache IIci cache card 64K | 349 |
| Magic RailGun 030 Accelerator 16 | 499 |
| Magic RailGun 030 Accelerator 25 | 799 |
| Magic RailGun 030 Accelerator 33 | 1199 |
| Radius Accelerator 16 w/ coproc | 835 |
| Radius Accelerator 25 w/ coporoc | 1399 |

### Co-Processors

| | |
|---|---|
| 68851 PMMU | 119 |
| 68881/82 16Mhz | 99/199 |
| 68881/82 25Mhz | 249/299 |
| 68882 33Mhz | 399 |

### Connectivity

| | |
|---|---|
| Oracle Mac Developer | 109 |
| Oracle Mac Network | 549 |
| Avatar MacMainFrame II | 699 |
| Avatar MacMainFrame DX | 859 |
| Avatar MacMainFrame II/DFT | 925 |
| Cayman Gator Share NFS | 1399 |
| Cayman Gator Mail | 1669 |
| CC Mail LAN Package | 339 |
| CompuServe Member Kit | 20 |
| MacLink Plus/PC | 109 |
| DCA MacIRMA | 785 |
| DCA MacIRMA Workstation | 925 |
| DMA [illegible] MacTerm II | 116 |
| AppleShare | call |
| [illegible] Laser | 169 |
| [illegible] DataClub Server | 359 |
| Prodigy Startup Kit | 25 |

## HARDWARE

| | |
|---|---|
| Sitka Tops Network Bundle Mac | 189 |
| Sitka Tops Network Bundle IBM | 159 |
| Sitka Tops FlashCard | 155 |
| Sitka Tops FlashBox | 125 |
| Solona R Server | 499 |
| Solutions Faxgate Plus | 233 |
| Solutions Mail Maker 5 User | 114 |
| CE Software QuickMail 5 User | 221 |
| White Pine Exodus X Windows | 329 |
| White Pine Mac 240 | 131 |
| White Pine Mac 241 | 195 |
| 3 Com 3+Open Mac | 795 |

### CD ROM

| | |
|---|---|
| BMUG PD Rom Vol 1 | 52 |
| CD Technology Porta Drive | 689 |
| Grolier Electronic Encyclopedia | 235 |
| MacroMind CD ROM | 125 |
| Activision Manhole CD | 46 |
| Microsoft Office | 645 |
| NEC Port CDRom/interface | 479 |
| Toshiba CD Rom Drive | 749 |
| NEC Clip Art 3D | 249 |
| NEC Type Gallery PS | 259 |
| NEC CDR-72 Drive/interface | 789 |
| Voyager VideoStack | 68 |
| Voyager AudioStack | 68 |
| Voyager Bach. Brandburg Concerto | 68 |
| Warner Media Magic Flute | 43 |
| Warner Media Beethoven | 43 |

### Digitizers

| | |
|---|---|
| Calcomp 12x12 Tablet | 399 |
| Calcomp 12x18 Tablet | 729 |
| Calcomp 18x24 Tablet | 1325 |
| Calcomp WIZ Pen | 54 |
| Calcomp WIZ Tablet | 142 |
| Farallon MacRecorder | 153 |
| Farallon MacRecorder w/o soft | 92 |
| Farallon MediaTrack&MacRecord | 319 |
| Farallon MediaTracks | 189 |
| Kurta 8.5x11 | 259 |
| Passport Midi Interface | 73 |

## HARDWARE

### Emulation/Translation

| | |
|---|---|
| Orange Micro Mac 286 new | 1109 |
| Orange Micro Mac 86 new | 369 |
| Insignia SoftPC with AT/EGA | 339 |
| Insignia SoftPC/AT/Drive1200/Rapport | 665 |
| Dayna Dos Mounter | 49 |
| Insignia Access PC | 78 |

### Mouse/Keyboard

| | |
|---|---|
| A+ Mouse | 56 |
| Abaton Pro Point | 89 |

**Applied Engineering**
1.44 MB High Density Floppy
**$228**

| | |
|---|---|
| CH RollerMouse | 75 |
| Datadesk Mac 101 | 129 |
| Datadesk Switchboard | 163 |
| Kensington TurboMouse | 109 |
| Keytronic MacPro Keyboard | 118 |

### Modems/Network

| | |
|---|---|
| Abaton Interfax 24/96 | 412 |
| Adaptec AHA SCSI Host | 165 |
| Adaptec EtherMac II Nubus | 349 |
| Adaptec Modem E | 349 |
| AE DataLink External Fax/MNP | 249 |
| AE DataLink Internal 2400 | 199 |
| AE DataLink MacPortable | 199 |

## HARDWARE

| | |
|---|---|
| Apple Ethernet Card | call |
| Asante Maccon+ IIE, ET | 345 |
| Asante Maccon+ SE E | 275 |
| Asante Maccon+ SE30E | 345 |
| Avatar MacMainFrame II Coax Gate | 1799 |
| Cayman Gator Box | 2099 |
| Cayman Gator Card Ethernet | 449 |
| Cypress FaxPro | 859 |
| Dayna EtherPrint Card | 339 |
| Dayna Port | 345 |
| Dayna Talk | 96 |
| Dayna Net/4L | 549 |
| Digiboard Digichannel NU/4I | 679 |
| Farallon StarController | 825 |
| Farallon StarController EN | 1589 |
| Farralon EtherNet Card | 415 |
| Hayes V Series | call |
| Incomm Internal 2400 Modem | 99 |
| Magic 2400 with SendFax | 98 |
| MagicNet Network | 17 |
| Novell EtherPort II | 489 |
| "Novell EtherPort SE,SE/30" | 449 |
| Nuvotech Nuvolink II | 285 |
| Nuvotech Nuvolink SC | 319 |
| Nuvotech TurboBridge | 309 |
| Nuvotech TurboStar | 1049 |
| Orchid Technololgies Fax Modem | 439 |
| Racal-Interlan Mac Connect | 369 |
| Shiva Ethergate | 1699 |
| Shiva Fastpath 4 | 1989 |
| Shiva Netbridge | 339 |
| Shiva Netmodem 2400 | 429 |
| Shiva Netmodem V.32 | 1429 |
| Shiva Netserial X232 | 274 |
| Shiva Telebridge | 339 |
| Tops/Sitca FlashBox | 123 |
| Tops/Sitca FlashCard | 155 |
| Telebit Trailblazer Plus 19200 BPS | 899 |
| Telebit T1000 9600 Baud | 625 |
| US Robotics Courier V32/9600 | 675 |
| US Robotics Courier HST Dual Stand | 949 |
| 3 Com EtherLink/NB | 425 |
| 3 Com Etherlink/SE | 355 |

## HARDWARE

### Display/Video Systems

| | |
|---|---|
| AAPPS Digivideo Color | 6[illegible] |
| 19" Trinitron Monitor | 23[illegible] |
| Calcomp 21"" Color 24bit System | 61[illegible] |
| Calcomp 21"" Color 8 Bit System | 45[illegible] |
| Calcomp 21"" Grey 8 Bit System | 22[illegible] |
| E-Macine T 16 | 23[illegible] |
| E-Macine Z21 IQ Grey MacII | 25[illegible] |
| E-Macine QuickView Studio | 19[illegible] |
| Computer Eyes B/W | 1[illegible] |
| Computer Eyes Color | 3[illegible] |
| Koala Mac Vision | 2[illegible] |
| Magic 8 bit color | 2[illegible] |
| Magic 8 bit color 19" | 4[illegible] |
| Magic 8 bit color SE/30 | 3[illegible] |
| Magnavox Color 14" | 4[illegible] |
| Mass Micro Colorspace FX | 25[illegible] |
| Mass Micro Colorspacell-I | 16[illegible] |
| Mass Micro QuickImage 24 | 7[illegible] |
| NEC MacSync 14" Color HC | 4[illegible] |
| Truevision NuVista+ w/Director 2 0 | [illegible] |
| Radius Direct Color 24 | 27[illegible] |
| Radius Direct Color 8 | 1469/14[illegible] |
| Radius Grey Shades Memory Exp | 1[illegible] |
| Radius Greyscale Interface | 10[illegible] |
| Radius Pivot | 7[illegible] |
| Radius Pivot SE/30, II Interface | 5[illegible] |
| Radius Precision Color Calibrator | 5[illegible] |
| Radius Quick Color GraphAcc465 | 5[illegible] |
| Radius TV System | 19[illegible] |
| Radius Two Page Display 19 | 10[illegible] |
| Radius Two Page Display 21 | 13[illegible] |
| Radius Two Page interface | 4[illegible] |
| RasterOps 208 | 3[illegible] |
| RasterOps 24L | 28[illegible] |
| RasterOps 24L 16 | 49[illegible] |
| RasterOps 24L 19 | 57[illegible] |
| RasterOps 24L Calibrator sys 19" | 89[illegible] |
| RasterOps 264/MacII | 4[illegible] |
| RasterOps 264/SE30 | 6[illegible] |
| RasterOps 364 | 1[illegible] |
| RasterOps 8L | 14[illegible] |
| RasterOps 8L 16 | 35[illegible] |
| RasterOps 8L 19 | 43[illegible] |

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## MagicScan 256

8-bit grayscale flatbed scanner
300 DPI and 256 levels of gray for
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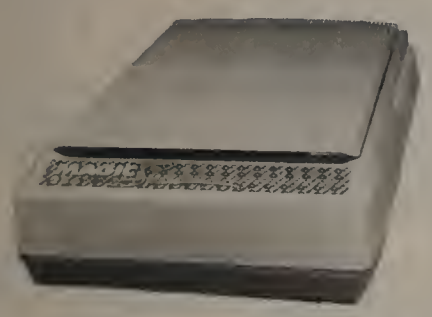
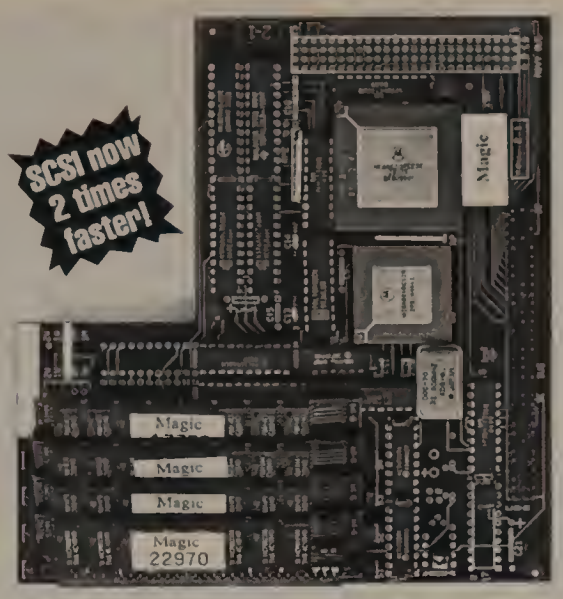
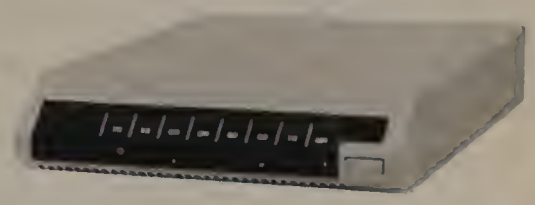
agicScan 256. .....$1195
agicScan 256 w/Colorset .....$1345
**Coming Soon-- 24-bit Color MagicScan!**






## Magic Modems



2400 Baud V.42 bis MNP-5 Modem
Send & Recieve up to 9600 Baud
**$199**
2400/1200/300 Baud • 100% Hayes
Compatible • Auto Answer/Dial • 2 Year
Warranty
**$69** with purchase of cable

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| CPU | 4/40 | 4/105 | 4/170 |
|---|---|---|---|
| Mac IIci | 4550 | 4779 | 4999 |
| Mac IIfx | 6499 | 7899 | 8179 |
| **CPU** | 5/40 | 5/105 | 5/170 |
| Mac IIcx | 3837 | 4041 | 4288 |

Mac Portable-1/40 $3999 Mac IIci AUX-4/80 $5199

## RailGun '030' Accelerator

**With New Accelerated SCSI Access!**
Give your Mac 128K, 512k, Plus or Mac SE the speed and performance the new Macs offer with a Magic RailGun Accelerator Board.

16 MHz Rail Gun for the Plus, SE $499
25 MHz RailGun for the Plus, SE $799
33 MHz RailGun for the Plus.....$1199
RailGun SCSI For 128k & 512k .....$99
**Afterburner** Accelerated math- up to 50 MHz...$49

## Magic Fax Modems

2400/9600 Baud Fax Modem, Send & Recieve..$149
2400/9600 Baud SendFax/Modem.....$119
2400/4800 Baud SendFax/Modem.....$99

**All Magic Fax Modems are100% Hayes & Group 3 Compatible**

**MagicNet**
**$17**

### HARDWARE

| | |
|---|---|
| asterOps 8L Calibrator sys 19" | 7549 |
| asterOps ClearView GS Mac | 1549 |
| asterOps ClearView Mac II | 1148 |
| asterOps 232 | 2115 |
| asterOps Accelerator | 819 |
| asterOps FrameGrabber 324 | 1055 |
| asterOps SFX | 1055 |
| gma ColorMax 8/24 19" | 4299 |
| gma L View MultiMode 19" | 1399 |
| gma Silverview M21 | 1519 |

**Printers**

| | |
|---|---|
| pple Laser Writer Intx | 4199 |
| pple Personal Laser Writer | 2499 |
| icomp 1023 Plotter | 3899 |
| icomp Raster Plotters | call |
| C | call |
| DeskWriter | 725 |
| LaserJet IID | 2749 |
| LaserJet III | 1755 |
| LaserJet IIP | 1089 |
| PaintJet | 1149 |
| PaintWriter XL w/ interface | 2049 |
| odak Diconix M150 | 495 |
| odak Color 4 Printer | 1179 |
| EC Colormate PS | 7149 |
| ewGen PS480 | 5399 |
| acific MacPage PostScript HP Cart | call |
| anasonic KXP4455 LaserPartner | 2399 |
| MS ColorScript | 7699 |
| MS ColorScript 100 | 7699 |
| MS PS 410 | 2099 |
| MS PS 480 | 2175 |
| ek Smart Label Printer | 199 |
| ekosha SP1000 Dot Matrix | 209 |
| harp JX 730 color inkjet | 1999 |
| MicroLaser 17 Postscript | 1749 |
| MicroLaser 35 Postscript | 2079 |

**Accesories, Disks, Ribbons**

| | |
|---|---|
| ppris SE Carrying Bag | 59 |
| merican Power 1000SE UPS | 215 |
| merican Power 1000 UPS | 339 |
| ntiGlare SE Anti Radiation | 51 |

### HARDWARE

| | |
|---|---|
| Custom TrackBall | 9 |
| HP DeskJet Cartridges | 17 |
| ImageWriter Black Ribbons | 3 |
| ImageWriter Color Ribbons | 3 |
| ImageWriter II Dust Cover | 7 |
| ImageWriter Multi Color Ribbon | 11 |
| Jet Fill Desk Writer Re-Fill | 10 |
| LaserWriter II Dust Cover | 13 |
| Mac Tilt/Swivel | 22 |
| MacDisk DS/DD Bulk 50 | .49 |
| 150 Meg Backup Tape | 35 |
| Monitor Cable Extension Kit | 30 |
| Monitor Stand Mac IIcx | 47 |
| Monitor Stand Mac II | 63 |
| SE w/Ext Keyb Cover | 7 |
| Security System | 33 |
| Sony DS/DD Box 10 | 11 |
| Sony DS/DD Bulk 50 | 1 |
| Sony DS/HD Box 10 | 19 |
| Sony DS/HD Bulk | 2 |
| System Saver SE | 49 |
| TI MicroLaser Toner Kit | 41 |
| 60 Meg Backup Tape | 22 |

**Scanners**

| | |
|---|---|
| Abaton 300GS | 1350 |
| Logitech ScanMan | 335 |
| Microtek MSF300ZS | 1699 |
| Microtek MSF400GS | 2699 |
| Microtek MS Interface | 999 |
| Sharp JX 300 | 2499 |
| Sharp JX 450 | 5199 |
| Sharp JX100 | 699 |
| Magic Scan | 999 |
| HP Scanjet - w/interface | 1599 |
| Umax 256 300DPI Flatbed | 1149 |

**Storage**

| | |
|---|---|
| AE 3.5 1.44K | 228 |
| AE 3.5 800K | 189 |
| Bernoulli Transportable 44mb | 1099 |
| CMS SD20 | 329 |
| CMS SD30 | 355 |
| Fujitsu 800K | 139 |
| Kennect Drive 1200 | 249 |

### SOFTWARE

| | |
|---|---|
| Kennect Drive 360 | 249 |
| Kennect Drive 2.4 | 319 |
| Kennect Tech Rapport | 191 |
| Rodime R45 Plus Removable | 719 |
| Rodime Cobra 100E | 1045 |
| Rodime 20 Plus | 439 |
| Irwin Magnetics 40mb Tape | 639 |
| Irwin Magnetics 80mb Tape | 839 |
| PLI Infinity Turbo 45R | 769 |
| PLI Turbo Floppy | 273 |
| Micronet CMO Readwritable Optical | 2999 |

**TI Microlaser**
PS/17 $1749

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|---|---|
| Micronet 1.3GB Tape Backup | 2749 |
| Micronet SBT 2022 MB MiniTower | 11199 |
| Micronet SBT 1174 MB Minitower | 5999 |
| Dayna Single 360K | 479 |
| Dayna Single 1.2Mb | 549 |
| Dayna Single 1.44Mb | 625 |
| Dayna Dual 360K/1.2Mb | 665 |
| Dayna Dual 360K/1.44Mb | 739 |
| Dayna Dual 1.2Mb/1.44Mb | 809 |
| Teomar QT Mac 150 | 1599 |
| Teomar QT Mac 40 | 989 |

**Software**

| | |
|---|---|
| Actus Fileforce | 249 |

### SOFTWARE

| | |
|---|---|
| Adobe Type Manager | 59 |
| Adobe Type Reunion | 39 |
| Adobe Type Set I | 58 |
| Adobe Type set II | 58 |
| After Dark 2.0 New | 22 |
| Aldus Freehand | 315 |
| Aldus Persuasion | 315 |
| Aldus Pre-Print | 315 |
| Carbon Copy Mac | 117 |
| Carbon Copy Mac Twin Pack | 169 |
| Clans CAD | 569 |
| ColorStudio | 1489 |
| Dayna Dos Mounter | 52 |
| Design Studio | 439 |
| Disk Doubler | 45 |
| FileMaker Pro | 212 |
| FilmMaker | CALL |
| Hostage | 25 |
| Init Picker | 42 |
| Inside Information | 69 |
| MacProject II | 355 |
| MacroMind Director | 399 |
| Macromind Three-D | CALL |
| MiniCad - | 489 |
| Norton Utilities | 79 |
| PageMaker 4 | 495 |
| Adobe PhotoShop | 505 |
| Pirates | 33 |
| Quark Express 3.0 | 517 |
| SoftPC 1.3 | 243 |
| SoftPC 1.3 EGA AT Bundle | 355 |
| SoftPC 1.3 Portable | 243 |
| SoftPC EGA AT Option Module | 120 |
| StrataVision 3D | 299 |
| Studio 32 | 425 |
| Super 3D | 317 |
| SuperPaint | 129 |
| Swivel 3D Pro | 435 |
| The Playroom | 29 |
| Timbuktu | 95 |
| Timbuktu Remote | 123 |
| TypeAlign | 63 |
| TypeStyler | 114 |
| Virex | 57 |
| Ashlar Vellum | 665 |

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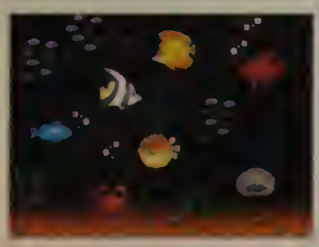

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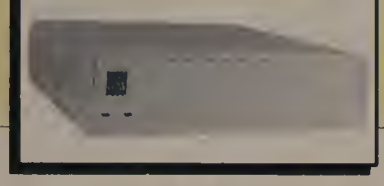

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| ppleSuperDrive (FDHD) | $199 |

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| | |
|---|---|
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| Kodak Diconix Ink Jet Printer | $489 |
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| **NEC Colormate PS** | $6985 |
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**Abaton**

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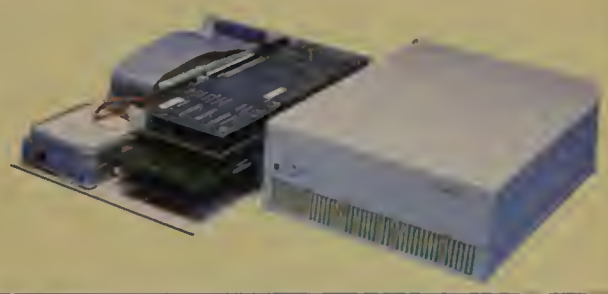

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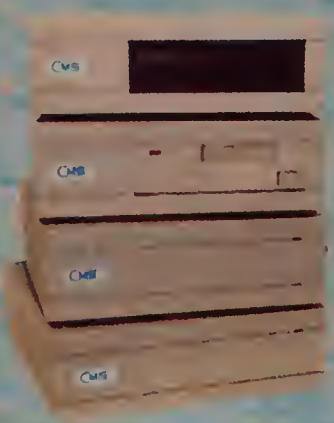

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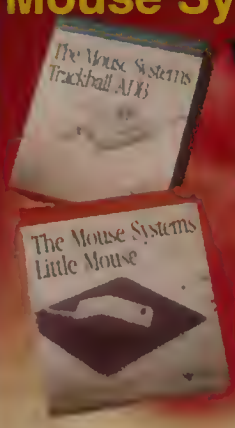


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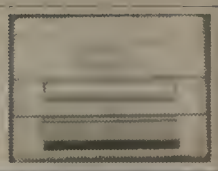

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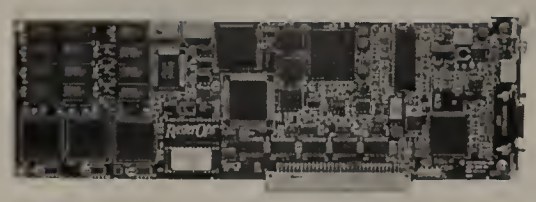

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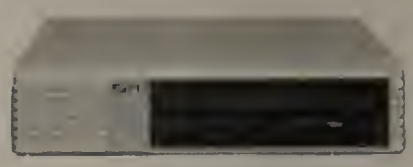

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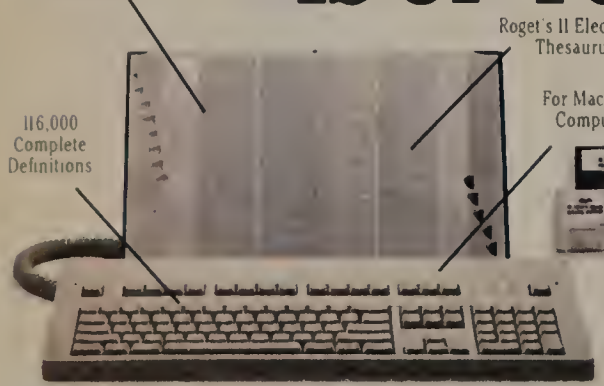


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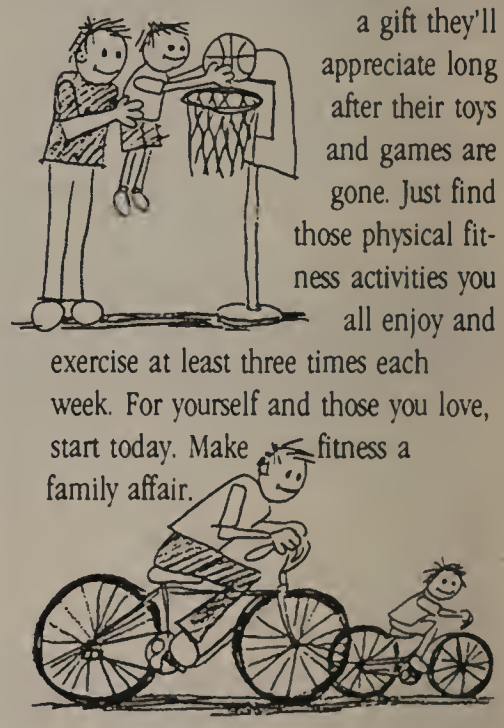

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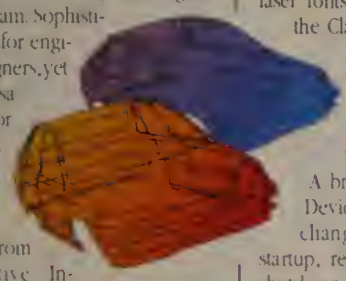

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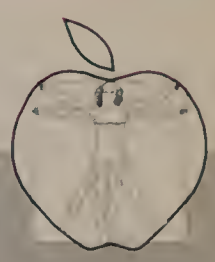

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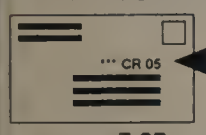


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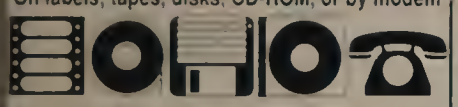

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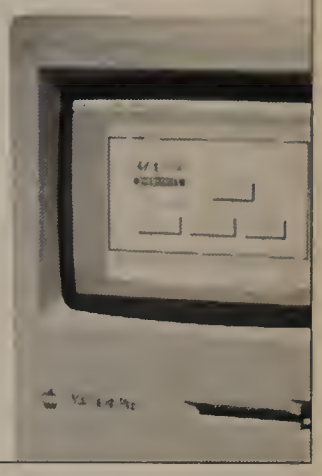

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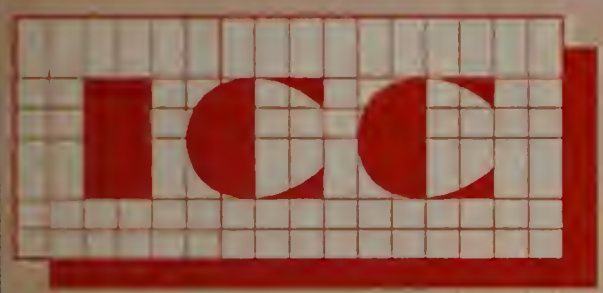

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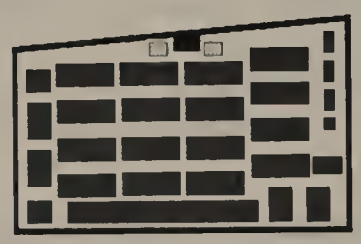

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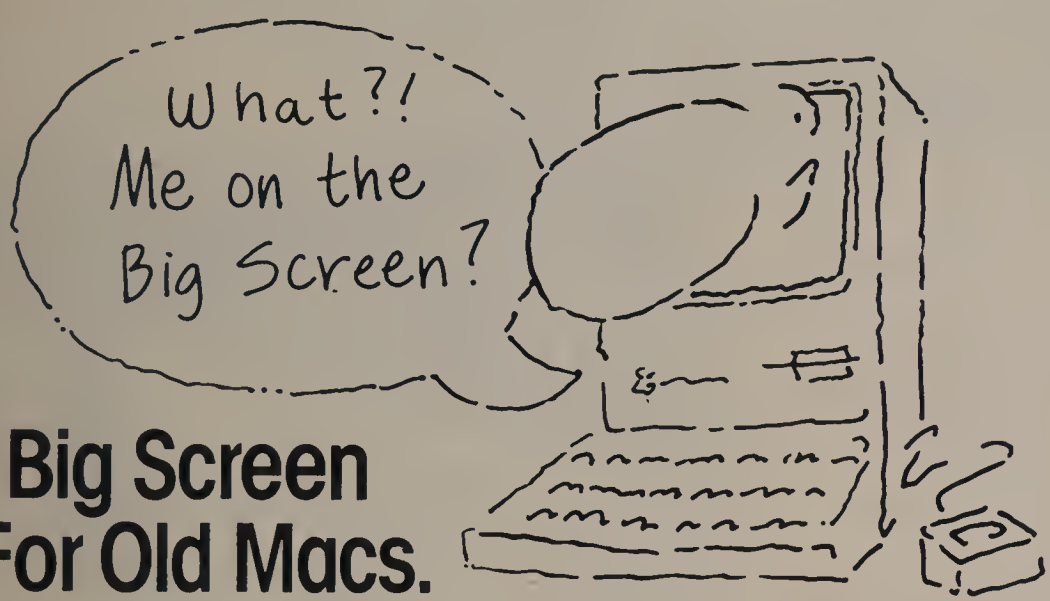


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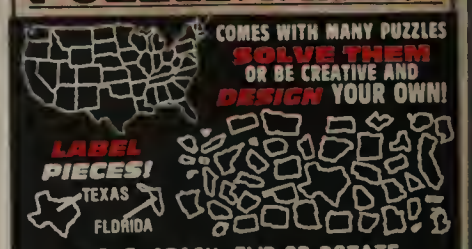


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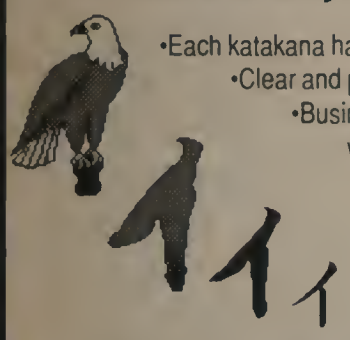

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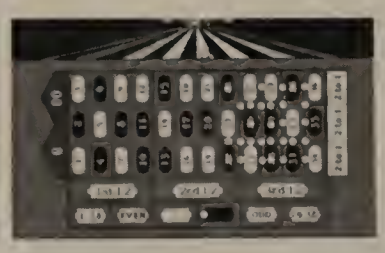

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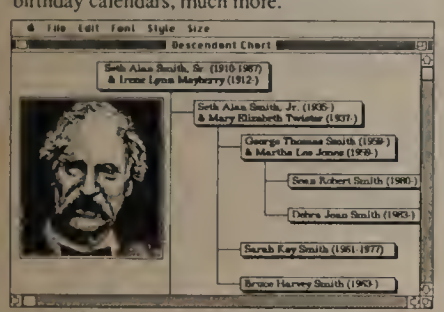


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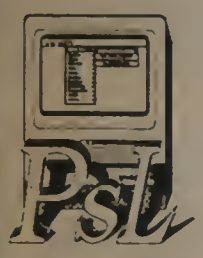

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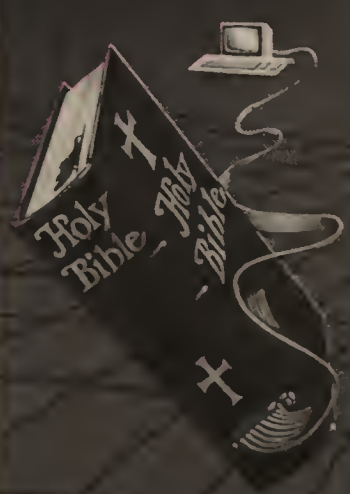


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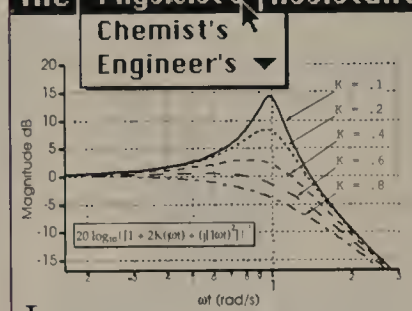


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| Qty. (Lexan— hard surface) | | |
|---|---|---|
| 12 | $6.45 wo/logo | N/A |
| 36 | $5.95 wo/logo | N/A |
| 7 2 | $5.70 wo/logo | $6.50 w/logo |
| 144 | $5.15 wo/ logo | $5.20 w/logo |
| 500 | $4.80 wo/logo | $4.60 w/logo |
| 1000 | $4.48 wo/logo | $4.48 w/logo |

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| Qty. | Canvas | Hard Surface |
|---|---|---|
| 12 | $8.50 w/logo | N/A |
| 72 | 5.90 w/logo | 7.15 w/logo |
| 144 | 3.96 w/logo | 5.21 w/logo |
| 500 | 3.40 w/logo | 4.65 w/logo |
| 1000 | 3.28 w/logo | 4.53 w/logo |

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|---|---|---|---|
| 12 Pads | 3.25 | 3.50 | 3.75 |
| 72 | 3.00 | 3.25 | 3.50 |
| 144 | 2.85 | 3.00 | 3.25 |

PLASTIC: Blue, Platinum, Gray, Red & Black. Size: 81/2x11

| | | | |
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  - APPLE II SERIES
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4-Color Apple ImageWriter II Ribbon
$5.97 each (In Packs of 2)
Mouse Pad $2.99 each
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($1.50 per pack of 50 labels)
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MWC11

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CIRCLE 668 ON READER SERVICE CARD

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# SANTA'S SPEC SHEET

Products marked with a † are confirmed to be available for less money (usually around 40 percent less) from mail-order companies like MacConnection, MacWarehouse, MacZone, Dr. Mac, and so on. Some software as indicated is available by modem from online services, such as America Online or CompuServe. A Macintosh user group is a good place to get them if you don't have a modem.

**Reader Service**

839 **ABCD Box** Data Spec; 818/772-9977. $69.95. Requires a Mac Plus.

• **ADB Keyboard Cable** MacConnection; 603/446-7711, 800/334-4444. $12. Requires Mac Plus.

840 **After Dark** Berkeley Systems; 415/540-5536, 800/877-5535. $39.95†. Requires Mac 512KE.

841 **America Online Starter Kit** Quantum Computer Services; 703/448-8700, 800/227-6364. Free. Requires Mac Plus and modem. After free first hour, a $5.95 monthly fee (includes 1 hour) and $5 per hour rate apply.

• **The Art of Human-Computer Interface Design** edited by Brenda Laurel. Addison-Wesley Publishing Company; 617/944-3700, 800/447-2226. 520 pages. $26.95.

842 **Discis Books** Discis Knowledge Research; 416/250-6537, 800/567-4321. $69.95; multilingual versions $89.95†. Requires CD ROM player.

843 **DiskDoubler 3.0** Salient Software; 415/321-5375. $79. Requires Mac Plus and System 6.0.2 or later.

844 **DisCoasters** The Computer Giftware Company; ~~415/321-5375~~. Salient Software $14.95†.

845 **Duskette Head Savers** Veino Ventures; 603/425-7054, 800/926-7577. $6.95.

• **Flowfazer** Utopia Grokware; 415/331-0714. $49.95. Requires Mac Plus and System 6.0 or later. (Note: Suspends printing or downloading when activated.)

846 **Inigo Gets Out** Amanda Goodenough, CompuServe; 614/457-8600, 800/348-8199. Free. Available from online services and user groups. Other Inigo stories, published by The Voyager Company, are available from ComputerWare (800/326-0092) and others. Requires a Mac Plus and HyperCard.

847 **LabelWriter Printer** CoStar; 203/661-9700, 800/426-7827. $249.95†. Requires a Mac Plus (or, with $20 cable, Mac 512KE).

848 **The Little Mac Book** by Robin Williams, Peachpit Press; 415/527-8555, 800/283-9444. 100 pages. $12.95.

849 **Macintosh Dust Covers** Abcom; 619/872-1946. $10 to $24.95.

850 **Mousepads** The Computer Giftware Company; 818/500-7857, 800/543-7326. $14.95 to $15.95†.

851 **Nada Chair** Nada-Concepts; 612/623-4436, 800/722-2587. $35.

852 **PassProof** Kensington Microware; 212/475-5200, 800/535-4242. $99.95†. Requires a Mac SE (specify when ordering).

853 **Protector Shark** Ibis Software; 415/546-1917. $49.95†.

854 **Pyro** Fifth Generation Systems; 504/291-7221, 800/873-4384. $39.95† Requires Mac 512K.

• **Solarian II** by Ben Haller. Stick Software. $25 (shareware). Available from online services and user groups. Requires color monitor.

• **Stupid Mac Tricks** by Bob LeVitus. Addison-Wesley Publishing Company; 617/944-3700, 800/447-2226. 112 pages. $19.95.

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# BEST-SELLERS

## BUSINESS SOFTWARE

| Months on chart | Last month | This month | | |
|---|---|---|---|---|
| 67 | 1 | 1 | **Microsoft Word** | Microsoft |
| 46 | 3 | 2 | **Microsoft Works** | Microsoft |
| 58 | 2 | 3 | **Microsoft Excel** | Microsoft |
| 54 | 4 | 4 | **Aldus PageMaker** | Aldus |
| 43 | 5 | 5 | **MacWrite II** | Claris |
| 7 | 6 | 6 | **Quicken** | Intuit |
| 19 | 7 | 7 | **FileMaker II** | Claris |
| 20 | 8 | 8 | **QuarkXPress** | Quark |
| 10 | — | 9 | **Wingz** | Informix |
| 16 | — | 10 | **Adobe Illustrator 88** | Adobe |

## EDUCATION SOFTWARE

| Months on chart | Last month | This month | | |
|---|---|---|---|---|
| 21 | 2 | 1 | **Where in the World Is Carmen Sandiego?** | Brøderbund |
| 2 | — | 2 | **Where in Time Is Carmen Sandiego?** | Brøderbund |
| 34 | 1 | 3 | **Reader Rabbit** | The Learning Company |
| 8 | 3 | 4 | **Where in the USA Is Carmen Sandiego?** | Brøderbund |
| 1 | — | 5 | **Where in Europe Is Carmen Sandiego?** | Brøderbund |

## ENTERTAINMENT SOFTWARE

| Months on chart | Last month | This month | | |
|---|---|---|---|---|
| 10 | 2 | 1 | **Tetris** | Spectrum HoloByte |
| 12 | 1 | 2 | **SimCity** | Maxis Software |
| 21 | 3 | 3 | **Falcon** | Spectrum HoloByte |
| 4 | 4 | 4 | **Welltris** | Spectrum HoloByte |
| 17 | — | 5 | **Beyond Dark Castle** | Silicon Beach Software |

## NETWORK/DATA COMMUNICATIONS

| Months on chart | Last month | This month | | |
|---|---|---|---|---|
| 46 | 1 | 1 | **TOPS** | Sitka Corporation |
| 41 | 2 | 2 | **AppleShare** | Apple Computer |
| 3 | — | 3 | **Timbuktu** | Farallon Computing |
| 1 | — | 4 | **AppleShare Print Server** | Apple Computer |
| 12 | — | 5 | **Netware for Macintosh** | Novell |

## MASS STORAGE*

| Months on chart | Last month | This month | | |
|---|---|---|---|---|
| 25 | 2 | 1 | **MacStack SD20** | CMS Enhancements |
| 10 | 1 | 2 | **MacStack SD40** | CMS Enhancements |
| 1 | — | 3 | **SD45 RM (Removable)** | CMS Enhancements |
| 12 | 3 | 4 | **MacStack SD30** | CMS Enhancements |
| 36 | 5 | 5 | **Apple Hard Disk 20SC** | Apple Computer |

## ADD-IN BOARDS/MEMORY

| Months on chart | Last month | This month | | |
|---|---|---|---|---|
| 1 | — | 1 | **Macintosh Display Card 8•24** | Apple Computer |
| 1 | — | 2 | **Spectrum 24/Series III** | SuperMac |
| 2 | 2 | 3 | **Pivot** | Radius |
| 1 | — | 4 | **ColorBoard 208** | RasterOps |
| 3 | 3 | 5 | **Radius TPD Interface** | Radius |

## UTILITY SOFTWARE

| Months on chart | Last month | This month | | |
|---|---|---|---|---|
| 8 | 1 | 1 | **SAM II** | Symantec |
| 8 | 2 | 2 | **SUM II** | Symantec |
| 8 | 5 | 3 | **Adobe Type Manager** | Adobe |
| 2 | 3 | 4 | **Norton Utilities for the Macintosh** | Peter Norton Computing |
| 2 | 4 | 5 | **Macintosh Tools Deluxe** | Central Point Software |

## PRODUCT WATCH

Recent or forthcoming products of particular interest.

**ithink** *High Performance Systems*
Modeling and simulation tool

**MultiMedia Toolkit** *Light Source*
Adds Mac control to NEC's PC-VCR high-speed editing VCR

**SpectreTouch** *Pre-Press Technologies*
24-bit color photo–retouching program

Source: Exclusive InfoCorp survey of more than 125 Macintosh retailers and selected mail-order vendors. Covers sales during August 1990.

*Does not include hard drives installed at the factory.

# Survival of the fittest.

## Which color scanner is the natural selection?

**Microtek Scan** Original: 8 x 10 B&W print
Brightness level: n/a Input resolution: 150 dpi
File Size: 486K Output Resolution: 300 dpi
Line Screen: 133 lpi Gamma Correction: None

When it comes to selecting the right scanner, be forewarned. It's a jungle out there. You may not get the quality you were promised.

The La Cie Silverscanner has evolved beyond all that. Just look at this comparison between the Microtek 300ZS and the La Cie Silverscanner. Each image was scanned at standard settings with no corrections. This ad was then created and separated using Adobe Photoshop, QuarkXPress and a Linotronic 330.

As you can see, Silverscanner is a more advanced species of scanner which adapts better to a changing environment.

Silverscanner provides superior color, gray scale and line art over any other similar species of scanner. And as a bonus, Adobe Photoshop Limited Edition, Aldus PrePrint, Silverscan and Silverlining are included FREE with every Silverscanner purchase.

Silverscanner. More evolved. More advanced. More value. Natural selection at its finest.

**LaCie Scan** Original: 8 x 10 B&W print
Brightness level: 2 Input resolution: 150 dpi
File Size: 484K Output Resolution: 300 dpi
Line Screen: 133 lpi Gamma Correction: None

**Microtek Scan** Original: 8 x 10 color print
Brightness level: n/a Input resolution: 150 dpi
File Size: 1,506K Output Resolution: 300 dpi
Line Screen: 158lpi Color Correction: None

**La Cie Silverscanner:** 16 million beautiful colors, 256 smooth shades of gray, incredible line art, up to 600 dpi all in a single pass.

**LaCie Scan** Original: 8 x 10 color print
Brightness level: 2 Input resolution: 150 dpi
File Size: 1,502K Output Resolution: 300 dpi
Line Screen: 158 lpi Color Correction: None

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# CLAIMS VS. ACCLAIMS

A lot of manufacturers say they have the best trackball, but only the Kensington Turbo Mouse® has the awards to prove it.

MacUser gave it the coveted Five Mice. And the readers of Macworld magazine voted it "Best Input Device" — not just once but *four years in a row.*

What makes Turbo Mouse outshine the rest?

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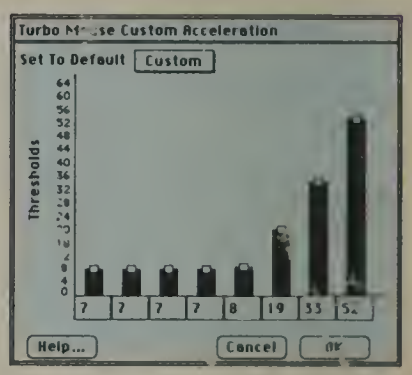


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For a free brochure, and the dealer nearest you, call 800-535-4242. Outside the U.S.A., call 212-475-5200.

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